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Mindfulness in Pharmacy Education: A National Mixed-Methods Study

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List of Abbreviations

Guide: Terms are described when first introduced, and abbreviations are used thereafter.

ANCOVA	Analyses of Co-Variance
CASP	Critical Appraisals Skills Programme
CBT	Cognitive Behavioural Therapy
CENTRAL	Cochrane Central Register of Controlled Trials
COREQ	Consolidated Criteria for Reporting Qualitative Research
CPD	Continuing Professional Development
CREC	Clinical Research Ethics Committee
EU	European Union
FFMQ	Five Facet Mindfulness Questionnaire
FG	Focus Group
GHQ	General Health Questionnaire
HPA	Hypothalamic-Pituitary Adrenal
IIoP	Irish Institute of Pharmacy
IPL	Inter Professional Learning
IPU	Irish Pharmacy Union
JSE-HPS	Jefferson Scale of Empathy – Health Profession Student version
MANCOVA	Multivariate Analyses of Co-Variance
MBCT	Mindfulness-Based Cognitive Therapy
MBI	Mindfulness-Based Intervention
MBI-SS	Maslach Burnout Inventory – Student Survey

MBI-TAC	Mindfulness-Based Interventions Teaching Assessment Criteria
MBSR	Mindfulness-Based Stress Reduction
MRI	Magnetic Resonance Imaging
NICE	National Institute of Health and Care Excellence
NNT	Number Needed to Treat
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analyses
PSI	Pharmaceutical Society of Ireland
PSS	Perceived Stress Scale
QUB	Queens University Belfast
RCSI	Royal College of Surgeons in Ireland
ROI	Republic of Ireland
RPSGB	Royal Pharmaceutical Society of Great Britain
SOP	Schools of Pharmacy
SPSS	Statistical Package for Social Science
TA	Thematic Analysis
TCD	Trinity College Dublin
T1	Time Point 1 (baseline, pre intervention)
T2	Time Point 2 (post intervention)
UCC	University College Cork
UCD	University College Dublin
UK	United Kingdom
USA	United States of America
UU	Ulster University
VLE	Virtual Learning Environment

Declaration

This is to certify that the work I am submitting is my own and has not been submitted for another degree, either at University College Cork or elsewhere. All external references and sources are clearly acknowledged and identified within the contents. I have read and understood the regulations of University College Cork concerning plagiarism.

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Michelle O'Driscoll

Date:_____.

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Publications, Presentations and Training

Peer-reviewed publications

- **O'Driscoll M,** Byrne S, McGillicuddy A, Lambert S, Sahm LJ. The effects of mindfulness-based interventions for health and social care undergraduate students: a systematic review of the literature. *Psychology Health and Medicine.* 2017;22(7):851-865. doi: 10.1080/13548506.2017.1280178
- **O'Driscoll M,** Byrne S, Kelly M, Lambert S, Sahm LJ. A thematic analysis of pharmacy students' experiences of the undergraduate pharmacy degree in Ireland and the role of mindfulness. *American Journal of Pharmaceutical Education.* 2019;83(1):6457.

Peer-reviewed published abstracts

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- **O'Driscoll M,** Byrne S, Lambert S, Sahm LJ. Mindfulness training for pharmacy undergraduate students in University College Cork (UCC) – quantitative results of a mixed-methods study. *Pharmacy Education*. 2018;18(1):2.

Under review in peer-reviewed journals

- **O'Driscoll M,** Byrne S, Lambert S, Sahm LJ. Health and social care undergraduate students' experiences and perceptions of mindfulness-based interventions: a systematic review of the qualitative literature. Currently under review in *Mindfulness.*
- **O'Driscoll M,** Sahm LJ, Byrne H, Lambert S, Byrne S. Impact of a mindfulness-based intervention on undergraduate pharmacy students' stress and distress: quantitative results of a mixed-methods study. Currently under review in *Currents in Pharmacy Teaching and Learning.*
- **O'Driscoll M,** Sahm LJ, Byrne H, Lambert S, Byrne S. Undergraduate pharmacy students' experiences of a mindfulness-based intervention: qualitative results of a mixed-methods study. Currently under review in *Currents in Pharmacy Teaching and Learning.*
- **O'Driscoll M,** Byrne S, Byrne H, Lambert S, Sahm LJ. An online mindfulness-based intervention for undergraduate pharmacy students: results of a mixed-methods study. Currently under review in *Currents in Pharmacy Teaching and Learning*.

Presentations

Workshop presentations

- **O'Driscoll M,** Byrne S, Lambert S, Sahm LJ. "You cannot pour from an empty cup" – a mindful approach to pharmacy education. Presented at the European Society of Clinical Pharmacy Conference in Heidelberg, Germany, 9th and 10th October 2017.

Oral presentations

- **O'Driscoll M**, Byrne S, Kelly M, Lambert S, Sahm LJ. Irish pharmacy students' experiences of the degree, and their views of mindfulness in pharmacy education: a qualitative study. Presented at the All Ireland Schools of Pharmacy Conference in University College Cork, 25th April 2017.
- **O'Driscoll M,** Byrne S, Lambert S, Sahm LJ. Mindfulness training for pharmacy undergraduate students in University College Cork (UCC) – quantitative results of a mixed-methods study. Presented at the Life Long Learning in Pharmacy Conference in Brisbane, Australia, 7th July 2018.

Poster presentations

- **O'Driscoll M,** Byrne S, Lambert S, Sahm LJ. Mindfulness in pharmacy: protocol for a randomised controlled study to determine the benefits of mindfulness-based stress reduction (MBSR) for pharmacy students. Presented at the International Social Pharmacy Workshop conference, Aberdeen, 21st July 2016.
- **O'Driscoll M,** Byrne S, Lambert S, Sahm LJ. The effects of mindfulness-based interventions for health and social care undergraduate students: a systematic review of the literature. Presented at the New Horizons in Medical Research Conference in University College Cork, 8th December 2016.
- **O'Driscoll M,** Byrne S, Lambert S, Sahm LJ. The effects of mindfulness-based interventions for health and social care undergraduate students: a systematic review of the literature. Presented at the 3rd Annual SPHeRE Conference in the Royal College of Surgeons in Ireland, 12th January 2017.

- **O'Driscoll M**, Byrne S, Lambert S, Sahm LJ. Pharmacy students' experiences of a four-week mindfulness course: qualitative results of a mixed-methods study. Presented at the European Society of Clinical Pharmacy Conference in Belfast on 24-26th October 2018.

Research-specific training

- Professional Diploma in the Teaching of Mindfulness-Based Interventions – Mindfulness Centre for Professional Training in Ireland.
- ST6013: Statistics and Data Analysis for Postgraduate Research Students – University College Cork.
- PG6015: An Introduction to Research Ethics – University College Cork.
- PG7016: Systematic Reviews for the Health Sciences – University College Cork.
- Articulate Storyline Software Training - University College Cork.

Thesis Abstract

Introduction

Stress is growing in prevalence and severity in the university setting, particularly in undergraduate health and social care education. High levels of stress within the pharmacy degree have also been demonstrated. Stress has a detrimental effect on physical and mental health if left to progress, ultimately negatively impacting upon students' future performance as healthcare professionals, and the quality of patient care provided. Calls have been made to determine the best way to teach self-care as well as patient care as part of the pharmacy degree. Mindfulness-based interventions (MBIs) have been shown to be of benefit in clinical and non-clinical settings, specifically in the areas of stress and distress reduction. Hence, the overarching aim of this thesis was to develop and assess the effectiveness of a mindfulness intervention to reduce pharmacy student stress and distress levels, and aid their personal development.

Methods

A mixed-methods approach to this research guided our study design. Firstly, quantitative and qualitative systematic reviews were conducted to determine the effectiveness of MBIs in the improvement of undergraduate health and social care students' stress and related outcomes. These reviews also identified the types of intervention designs and measurement tools employed in such studies to date. Secondly, a qualitative focus group study was conducted with pharmacy students across the island of Ireland, to explore students' current experiences of the pharmacy degree, the challenges they face, and whether there could be a role for mindfulness as part of their pharmacy education. Finally, these findings were used to inform the

design, delivery and analysis of two interventions; a face-to-face MBI for undergraduate pharmacy students in UCC, and an online MBI for undergraduate pharmacy students in the other four pharmacy schools on the island of Ireland. These interventions were wait-list controlled, and were assessed using validated quantitative measures for stress, distress, burnout, empathy and mindfulness levels, as well as thematic analysis of semi-structured interviews and free-text answers to open-ended questions.

Results

Despite the systematic reviews showing that MBIs were being used successfully in medical, nursing, midwifery, psychology and social care education, there was as yet no intervention available that aimed to improve pharmacy student stress and distress through the use of an MBI. Our focus group study showed that pharmacy students were experiencing high levels of stress, often due to perfectionistic tendencies, and would welcome an MBI as part of the pharmacy degree. The face-to-face intervention that was designed based on these findings produced a statistically significant reduction in distress, as well as increases in observing and describing scores when delivered face-to-face. The online version of the intervention increased participants' professional efficacy, as well as their observation levels. Thematic analysis of the qualitative data provided insights into students' reasons for taking part, their experience of the course, and how best to implement any future intervention. Limitations of the study included high dropout rates, and lack of long-term follow-up.

Conclusions

This thesis has made a significant contribution to the knowledge available regarding the use of MBIs in undergraduate health and social care education, and has achieved promising progress in the development of an MBI for use in the undergraduate pharmacy education setting. While preliminary mixed-methods investigations into the effectiveness of this novel intervention have been promising, further research and larger studies are required to improve and refine the approach, and increase the quality and generalisability of findings.

Thesis Overview

This thesis is composed of a number of individual studies, as described in Chapters 2 to 7 inclusive.

The main aim of this research was to determine if pharmacy students' mental health and personal development could be improved upon by offering mindfulness as part of their undergraduate education.

To achieve this aim, four distinct but overlapping objectives were identified:

1. To identify and critically appraise the available quantitative literature regarding the use of mindfulness in health and social care undergraduate students.

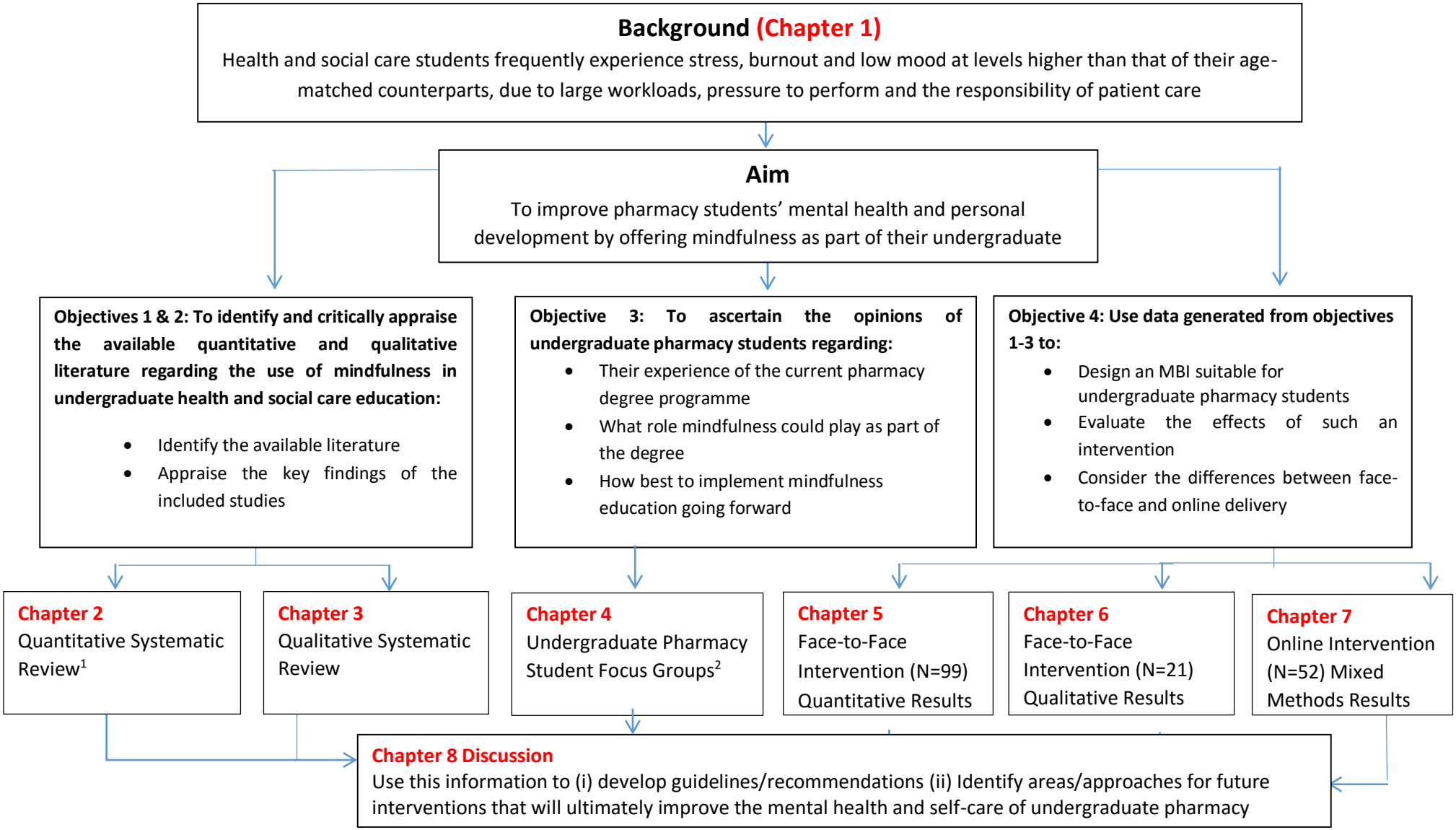
2. To identify and critically appraise the available qualitative literature regarding the use of mindfulness in health and social care undergraduate students.

3. To ascertain the opinions of undergraduate pharmacy students regarding their experiences of the current pharmacy degree programmes, and the role that mindfulness could potentially play in this area.

4. Based on the results generated from objectives 1-3, to develop an MBI for undergraduate pharmacy students on the island of Ireland, quantitatively and qualitatively evaluate its effects, and explore students' experiences of taking part.

Figure 0.1 details how the aim and objectives have been met through the individual chapters and studies undertaken as part of this PhD.

Figure 0.1 Background, overall aim and objectives of PhD thesis



Chapter 1: Introduction

1.1 Background

1.1.1 Stress

Stress has contributed to the mental health crisis of the western world. It has been named as the second most frequently reported work-related health problem in the European Union (EU), affecting 22% of workers.[3] A 2018 online survey of 4,619 participants, conducted on behalf of the Mental Health Foundation in the United Kingdom (UK), reported that 74% of participants felt so stressed that they were overwhelmed or unable to cope in the past year.[4] Similarly, results of the *'How are You Ireland?*' survey, developed by the Science Foundation Ireland Insight Centre for Data Analytics in University College Dublin (UCD) revealed that over two-thirds of respondents had felt anxious, depressed or irritable in the previous week, as a result of excess stress.[5]

1.1.2 Physiology of stress

Stress is a physiological process, experienced when a person encounters a '*stressor*' or threat which is perceived to be a danger to their health or wellbeing, and exceeds their ability to manage it.[6] Some common features of stressors include experiencing something new or unexpected, a situation that challenges one's capabilities, or an event over which there is little control.[7] Activation of the hypothalamic-pituitary adrenal (HPA) axis via the release of adrenaline and cortisol occurs when the demands placed on an individual exceed their perceived ability to cope with these demands.[8] Also known as "*fight or flight*," the resulting cascade of chemicals triggered in the body exists as essential evolutionary adaptation in order to survive

the real threat of predators.[9] However, in today's modern world, stress is chronically activated unnecessarily on a daily basis in response to emails, deadlines, relationship issues and financial challenges.[9] Excessive activation over prolonged periods of time leads to detrimental effects on one's health, both physically[10-12] and mentally.[13, 14]

1.1.3 Effect of stress on mental health

Chronic stress can lead to other mental health issues. Mental health problems are one of the main causes of the overall disease burden worldwide, accounting for 21.2% of years lived with disability, with some estimating this figure to actually be as high as 32.4%.[15]

There is a growing body of evidence highlighting the prevalence of mental health disorders in young people globally, including university students,[16] with 93% of young people in the UK reporting feeling overwhelmed or unable to cope in the past year.[17] Half of the 1,453 university students included in a meta-analysis of interventions for stress reduction conducted by Canadian researchers reported experiencing significant anxiety and/or depression due to stress.[18] It has also been shown that such stress increases as university progresses; a large study of 16,460 participants found that UK students' depression levels increased over time, and did not return to baseline levels.[19]

1.1.4 Stress in undergraduate health and social care education

Health and social care undergraduate students in particular encounter significant stress due to the demands of coursework, new environments, financial pressures and the application of new clinical and practical skills.[20, 21] Similarly to the general

population, this stress can have a negative impact on the physical health, mental health, and academic performance of this cohort.[22, 23] High mental distress levels and low life satisfaction have been revealed time and again among students in healthcare courses.[24, 25] Some studies have indicated that levels of stress and depression among medical students exceed those of their peers in non-clinical courses,[26, 27] and that burnout increases gradually over time.[28]

Pharmacy students experience similar challenges. One study reported that pharmacy students were the most likely undergraduate group to suffer from stress, while research in the United States of America (USA) and the United Kingdom (UK) has shown that pharmacy students demonstrate higher stress levels than the general population, regardless of year of study.[29, 30]

1.1.5 Stress and mental health issues as a healthcare professional

Healthcare student stress is reportedly linked to subsequent stress exhibited once qualified and practising as a healthcare professional.[31] Studies have shown that mental health issues experienced by healthcare students in their early years of study, impact negatively upon their subsequent mental health post-qualification.[32, 33] The psychological challenges and responsibilities associated with, but not limited to, managing patients as a healthcare professional can lead to depression and burnout, adversely affecting personal wellbeing.[34]

Pharmacists reflect these findings, with a 2004 study of 1,737 practising pharmacists in the USA reporting that 68% of participants experienced job stress and role

overload.[35] In 2009, the Royal Pharmaceutical Society of Great Britain (RPSGB) identified high levels of stress amongst its membership.[36] A further study reported that pharmacists were more likely than surgeons or physicians to resign from their jobs due to high stress levels.[37] These findings are a cause for concern, as high levels of stress can compromise patient safety, through poor decision making and an increased risk of medication errors,[38] seriously impacting upon the quality of care offered to patients.[38-40]

1.1.6 Current pharmacy education

There is a growing recognition of the need to teach relevant coping skills and resilience as part of undergraduate healthcare education programmes.[41] Currently, the training and continuing professional development (CPD) of pharmacy students in the Republic of Ireland (ROI) is guided by the Core Competency Framework for Pharmacists, developed by the pharmacy regulator; the Pharmaceutical Society of Ireland (PSI).[42] The behaviours outlined in this document highlight the broad skillset that pharmacists require in order to be considered "*fit to practice,*" including personal, organisational and management skills. In Ireland, the electronic (e)Portfolio recording system for CPD used by pharmacists, is governed by the Irish Institute of Pharmacy (IIoP).[43] The portfolio accepts personal submissions of "*life-wide*" as well as "*life-long*" learning, i.e. academic and non-academic opportunities to develop and demonstrate skills useful in the workplace. Currently the degree is predominantly academic based. Hence, *w*hile pharmacy students are adequately prepared academically for their future professions,[44] the best way to equip this cohort with the

appropriate skills to deal and cope with stress and the consequences of it through formal education has yet to be identified and evaluated.

1.1.7 What is mindfulness?

While originally rooted in Buddhist psychology, mindfulness in secular western research has grown in prominence in recent years. Defined by Dr. Jon Kabat-Zinn *as "paying attention in a particular way, on purpose, non-judgmentally, to the present moment,"*[45] mindfulness is a brain training technique that positively changes how one relates to their present experience, breaking old habits of worry and rumination, and cultivating an attitude of acceptance rather than struggling to change the un-changeable in life.[46] Sensations, feelings and thought patterns are viewed with a sense of impartiality, allowing for greater discernment in how best to respond wisely, rather than reacting automatically to challenging situations and emotions. Mindfulness facilitates an "*allowing*" or "*non-judging*" attitude towards the present moment, avoiding unnecessary stress and distress in situations that are not controllable. It also cultivates an improved ability to judge the best course of action in situations where we have choices and options.[47]

1.1.8 Mindfulness research

The volume of research being conducted in the area of mindfulness has grown exponentially in the past decade. A search of PubMed™ by year shows that in 2008, 104 papers were published in this area. In contrast, over 1,000 research articles went to print in the first ten months of 2018. These figures are primarily representative of interventions based upon two key types of MBIs; Mindfulness Based Stress Reduction (MBSR) and Mindfulness-Based Cognitive Therapy (MBCT). MBSR was developed by

Dr. Kabat-Zinn in 1979 to help hospital patients who were dealing with serious illness and chronic pain.[48] MBSR was subsequently combined with Cognitive Behavioural Therapy (CBT) to create MBCT for the prevention of relapse in recurrent depression,[49] and is now part of the National Institute of Health and Care Excellence (NICE) guidelines for this particular indication, due to the strength of its research findings.[50] Since their design, these interventions and adaptations of them have been applied successfully to a myriad of populations and indications.[51-55] [56]

Research in the area of mindfulness has demonstrated benefits in clinical and non-clinical populations, from the treatment and support of mental and physical diagnoses, [57] [52] to the reduction of stress in adult and university populations.[58, 59] Structural brain changes have been demonstrated via magnetic resonance imaging (MRI), including a decrease in the size of the amygdala (area associated with stress and fear), and thickening of the prefrontal cortex (area associated with awareness, decision-making and concentration).[60] Reductions in salivary cortisol levels; a physiological indicator of stress, have also been documented.[61] In response to the level of evidence around the benefits of mindfulness, the Mindful Nation UK report published in October 2015 recommended that mindfulness should be introduced into national policy in the workplace, education and healthcare settings.[62]

1.1.9 Mindfulness in healthcare education

The use of mindfulness in the education of healthcare students is becoming more widespread. Studies which measure the effects of MBIs in these cohorts have produced promising results, particularly in relation to stress reduction and improved

mental health outcomes.[1, 63] Hence, it would be reasonable to hypothesise that similar benefits could potentially be produced for pharmacy students.

1.2 Methodological justification

1.2.1 Mixed methods research

This thesis used a mixed-methods approach to data collection and analysis. It has been shown in research in general, and mindfulness research specifically[64, 65] that a mixed-methods approach gives a more in-depth representation of participant experiences and benefits; the sum of the contributions of quantitative and qualitative data is deemed to be greater than that of each individual method indepently.[66, 67]

1.2.1.1 Quantitative data

Quantitative evaluations of the face-to-face and online interventions described in this thesis were conducted using several validated instruments:

- Stress was measured using the Perceived Stress Scale (PSS).[68] This ten-item scale asked participants to rate how often they had experienced particular feelings or thoughts in the last month. This tool was free to use, and has been validated and previously used in pharmacy students in the UK and the United States of America (USA).[29, 69]
- Mental distress was measured using the General Health Questionnaire (GHQ),[70] which required purchasing of rights to use. This test consisted of questions relating to mental distress experienced in the last two weeks. Examples of test items are "*able to concentrate*," and "*lost sleep over worry*."

The 12-item version of this test has been validated internationally, and for student populations.[71]

- Burnout was measured using the Maslach Burnout Inventory – Student Survey (MBI-SS) University Form.[72] This consists of 16 statements of university-related feelings, divided into three sub-categories; professional efficacy, exhaustion and cynicism. This is a cross-culturally validated survey[73] with good psychometric properties. This version has been tested on pre-clinical and clinical medical students,[74] and has been used on pharmacy students in the past.[75] A licence to use this instrument was purchased for the purpose of this research.
- Empathy was measured using the Jefferson Scale of Empathy – Health Professions Student Version (JSE-HPS).[76] This was a 20-item scale, consisting of statements about empathy towards patients and their situations, was used to determine participants' empathy levels. Developed for studies of medical students and health professionals, and subsequently validated in pharmacy students,[77] this scale has demonstrated good psychometric properties[78] and can predict empathy in students after they have qualified as a healthcare professionals.[79] Permission was granted for the use of this scale, and the authors kindly waived the fee for use of this instrument.
- How best to measure '*mindfulness'* scientifically is continuously debated in the literature.[80] Multiple measurement tools, with moderate to large correlations between them have been designed in recent years, in an effort to quantify mindfulness levels in a research context.[81] For the purposes of this thesis, mindfulness was measured using the Five Facet Mindfulness

Questionnaire (FFMQ).[82] This is a 39 item scale, and items are divided into the following five categories or '*facets*' of mindfulness: (a) observing, (b) describing, (c) acting with awareness, (d) non-judgement and (e) non-reactivity. This tool was free to use, and has been validated in healthcare student populations in the past.[64]

The internal consistency of each of the above tools was confirmed at the outset by calculating a Cronbach's alpha co-efficient value. This value is defined as an expression of the percentage of the variance in an index which can be accounted for by an underlying phenomenon, and a score of 0.7 or higher is deemed acceptable.[83] All values obtained are reported in the relevant chapters, and met the criteria of 0.7 or higher, except for the JSE-HPS in the face-to-face intervention (Chapter 5). The value obtained in this instance was much lower than the value required for internal consistency, hence these results were discarded.

Analysis of the quantitative results was conducted using Statistical Package for Social Science (SPSS)™ Statistics Software Version 23.0 (IBM, Microsoft Corp.), and a number of statistical methods were employed; these are described in their respective chapters.

1.2.1.2 Qualitative data

A variety of qualitative data collection and analysis methods were implemented at several stages of this thesis. The qualitative systematic literature review described in Chapter 3 used a thematic synthesis approach in order to generate a higher

interpretation of the individual studies' results.[84] The focus group method was utilised with students in Chapter 4, as it was felt that group discussions would yield rich results in this instance.[85] In contrast, semi-structured interviews were employed in Chapter 6, as it was felt that students would be more inclined to share their personal experiences of the intervention on a one-to-one basis.[86] Qualitative data collected during the interventions were analysed using Braun and Clarke's thematic analysis (TA).[87] This method allowed for themes to emerge naturally from the data, without being forced or pre-empted.

1.2.2 Intervention development and delivery

1.2.2.1 Instructor qualifications

It was anticipated that the direct delivery of a mindfulness intervention by the PhD student (MOD), who is a qualified pharmacist would make this an authentic and relatable experience for students, as she could identify with the stresses that students were facing. Furthermore, MOD has a personal mindfulness practice of over five years, which is considered essential for effective teaching in such an area.[88] MOD completed a Professional Training in Mindfulness-Based Approaches, delivered by the Mindfulness Centre for Professional Training in Ireland (Appendix 1).[89] This training made it possible for MOD to successfully design and deliver an MBI for pharmacy students.

The diploma is experiential and interactive in nature, with a small class ratio of 10 participants to two facilitators. It comprises three full days of training approximately every two months. Online support is offered in between classes. Three residential retreats form part of the course structure to allow for total immersion in the teaching

experience, and to simulate a suitable environment in which to put teaching skills into practice. Most importantly, the course covers the key requirements of the Mindfulness-Based Interventions Teaching Assessment Criteria (MBI-TAC), including the ability to hold a group, in-depth knowledge of the area, embodiment (conveying a mindful attitude, which facilitates greater learning in a mindfulness class), and the skill of inquiry (which draws out a person's experience of an exercise and allows them to learn more from this deeper exploration of their experience).[90] While there are a wide range of other training courses of shorter durations available in this area, it was felt that a more thorough training would better cultivate the knowledge and skills required to adequately deliver a mindfulness course in accordance with the best practice guidelines.

1.2.2.2 Supervision

Supervision at all stages of intervention design and delivery was provided by Ms. Helen Byrne (HB), a facilitator of the Diploma, who also delivers part of the Masters in MBIs in UCD.[91] HB is an experienced mindfulness teacher, who was trained by senior staff from the University of Massachusetts Centre for Mindfulness, including Dr Jon Kabat-Zinn and the other three authors of the original MBSR curriculum; Melissa Blacker, Saki Santorelli and Florence Meleo-Meyer. This supervision was provided in line with The Irish Good Practice Guidelines for Teaching Mindfulness-Based Courses.[88] Supervision was provided both face-to-face during intervention development, and via telephone during course delivery, and ensured course integrity and quality.

1.2.2.3 Intervention content

Several key changes were made to the existing MBSR curriculum in order to create a mindfulness intervention suitable for undergraduate pharmacy students. Chapters 2 and 3 present evidence of MBSR being successfully condensed for other healthcare students, while the opinions of students in Chapter 4 highlighted the challenges that recruitment would face if the course was too long in duration. The condensing of the curriculum was initially conducted by MOD, and drafts of this were sent to HB, who assessed the changes and advised on any further alterations. The resulting course provided a rich introduction to mindfulness, firmly rooted in the MBSR curriculum, deliverable in a relatively short time-frame. Course descriptions are provided in Chapter 5-7.

Table 1.1 summarises the key structural changes that were implemented for the design of the face-to-face and online courses respectively. Appendix 2 and 3 provide more in-depth information about the areas covered by each format.

Table 1.1 Comparison of MBSR to the adapted face-to-face and online courses delivered to pharmacy students.

	MBSR	Face-to-face adaptation	Online adaptation
No. of classes	8	4	4
Class duration (hrs)	2.5-3	2	1
Daily practice (mins)	45	20	20
Retreat (days)	1	0	0

The most significant alteration made to course content was the length of time spent at each exercise and subsequent inquiry; in most instances, the time spent at any

particular exercise was halved. There were also some elements of the MBSR course that were excluded as explicit sections, as it was felt by MOD and HB that they were not essential to the core teachings of the MBSR, and their absence did not remove key learnings from the course. For example, Week 6 and 7 of MBSR include an exploration of mindful communication. In the adapted course however, it was more implicitly incorporated during group discussions, encouraging participants to take turns and fully receive what the other person was saying, rather than setting aside 45 minutes to delve specifically into the area of communication. Also, the full day of practice in the MBSR course was excluded, as it was felt that while this would re-enforce the learning of the weekly courses, it would not be covering any new content and would pose a logistical challenge in terms of college timetables.

1.2.2.4 Online delivery of the intervention

An online version of the course was created in order to offer it to students in TCD, RCSI, QUB and UU (described in more detail within Chapter 7). Due to the variability across universities in terms of the Virtual Learning Environments (VLE) that were in use, it was decided that an independent website would be used to host the course. MOD liaised with IT staff in the Office of Teaching and Learning in UCC, and chose 'www.gnomio.com' as a suitable host platform. This platform allowed for the creation of a website (https://mindpharm.gnomio.com) into which the mindfulness course could be placed. It was possible to password protect the course, which was essential to prevent cross-group contamination, and was also a requirement of some of the companies from which measurement tools were purchased. MOD set up the new website, and retained administrative rights over it, allowing her to edit the

layout and content as needed. An individual section was created for each university that was taking part. The website was also subsequently used to host the daily exercises that UCC students were invited to complete between classes (Chapters 5 and 6).

MOD attended a two-day training in the use of Articulate Storyline© in UCC, and implemented what she had learned to create four individual online lessons. Classes included audio mindfulness exercises that the participant could play or pause as needed, simulated class interactions where the participant could hear and view a variety of experiences that participants report having after each exercise, and some didactic teaching. To optimise engagement with the online format, short presentations were created using Videoscribe™, an animation software that allows the user to place text and illustrations on a screen, so that it looks like a hand is writing or drawing them. They are brief and eye-catching, with an option to add audio, and were considered to be a suitable medium for conveying key learnings in an interesting way. Screenshots of a variety of sections of the online course are provided in Appendix 4.

The measurement tools described previously needed to be available to participants in an online format. They had to be embedded into www.mindpharm.gnomio.com, and report results to MOD via an Excel sheet or other suitable medium. It was decided that Google Forms, a component of Google Drive would produce the desired results. MOD created online versions of the measures using this programme,

embedded them into the website, and created them so that each one reported correctly to the corresponding spreadsheet for each university. Technical support was provided by the Office of Teaching and Learning, UCC throughout this process.

1.2.2.5 Mobile application design

A subsequent project collaboration was undertaken with an IT student in the College of Science, Engineering and Food Science, UCC in 2017. Masters student Hugh O'Dwyer, created a prototype of a mobile application, "Mind Your Mind" that could potentially be used by future course participants to access daily mindfulness practices, record stress levels, and engage with literature in the area of mindfulness research. This app was submitted as part of the student's Masters of Science in Interactive Media, and was tested by him on a general sample of adults. Although the app was not directly used in any of this PhD's research, and is not mentioned further going forward, the brief provided to the student and some screenshots of the resulting application have been included in Appendix 5 for reference purposes.

Chapter 2: The effects of mindfulness-based interventions for health and social care undergraduate students – a systematic review of the literature

An adapted version of this chapter has been published in *Psychology, Health and Medicine.* The full version of the review is provided here.

Publication: Michelle O'Driscoll, Stephen Byrne, Aoife Mc Gillicuddy, Sharon Lambert & Laura J. Sahm (2017) The effects of mindfulness-based interventions for health and social care undergraduate students – a systematic review of the literature, Psychology, Health & Medicine, 22:7, 851-865, DOI: 10.1080/13548506.2017.1280178

2.1 Abstract

2.1.1 Aim

Health and social care undergraduate students experience stress due to high workloads and pressure to perform. Consequences include depression and burnout. Mindfulness may be a suitable way to reduce stress in health and social care degree courses. The aim of this systematic review is to identify and critically appraise the literature on the effects of MBIs for health and social care undergraduate students.

2.1.2 Design

A systematic review was undertaken, applying a narrative synthesis approach to the eligible quantitative studies.

2.1.3 Data sources

The following databases were searched from inception to November 2016: PubMed, EMBASE, Psych Info, CINAHL, The Cochrane Library and Academic Search Complete. Key journals and reference lists were also examined.

2.1.4 Review methods

Studies that met the following criteria were eligible for inclusion: (i) used quantitative data collection and analysis methods; (ii) delivered a mindfulness intervention that was based on MBSR or MBCT; (iii) participants were undergraduate health or social care students; (iv) full text was available in English. The quality of included studies was appraised independently by two reviewers using the Cochrane Risk of Bias Assessment tool. A narrative synthesis was conducted.

2.1.5 Results

Eleven studies, representing students from medicine, nursing and psychology met the inclusion criteria. The most commonly used measurement tools were; the FFMQ and the GHQ. Benefits relating to stress and mood were reported, despite condensing the curriculum in all but one study. Gender and personality emerged as factors likely to affect intervention results.

2.1.6 Conclusions

The findings highlight the short-term benefits of MBIs for health and social care undergraduate students in areas including stress and mood, despite condensed curricula. Further research with long-term follow-up is required to definitively conclude that mindfulness is an appropriate intervention to mentally prepare health and social care undergraduate students for their future careers.

2.2 Introduction

Health and social care undergraduate students encounter significant stress throughout their years of study, and subsequent careers.[92] High workloads, and psychological challenges associated with managing patients can lead to depression and burnout which can negatively impact upon personal wellbeing.[93, 94] There is a growing body of evidence highlighting the prevalence of mental health disorders in young people worldwide, including university students[16, 95] Additionally, there is an increasing research focus on the negative impact of working in healthcare professions. This focus has produced terms such as; 'compassion fatigue', 'vicarious trauma' and 'secondary trauma'.[96] This can result in poor decision making and medication errors, both of which can adversely affect patient care.[97]

Wellness is becoming increasingly viewed as an essential competency for healthcare workers, but the optimal approach to teaching wellness is yet to be confirmed.[98] It has been argued that to reduce the social, economic and personal burdens associated with poor mental health, more interventions are required within the education system.[99]

Mindfulness, defined by Dr. Jon Kabat Zinn as: *"paying attention in a particular way, on purpose, non-judgmentally, to the present moment"* is a brain-training technique, which can facilitate clearer thought processes and decision making.[46]

MBSR, developed by Dr. Kabat-Zinn in 1979 for hospital patients dealing with serious illness and chronic pain, was subsequently combined with CBT to create Mindfulness

MBCT, a programme for the prevention of depression relapse[49] and addiction treatment.[100]

These MBIs produced benefits in clinical and non-clinical populations, from the treatment of physical ailments,[101] to the reduction of stress in healthy adults.[102] Structural brain changes in areas associated with planning, problem solving and emotional regulation have also been revealed.[103]

While mindfulness could potentially prepare students mentally for future careers and mediate for stress while studying, the available evidence must be examined. The aim of this systematic review is to identify and critically appraise the available evidence regarding the benefits of MBSR/MBCT for health and social care undergraduate students.

2.3 Methods

The systematic review was conducted according to Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines,[104] in so far as was practical (see Appendix 6). The protocol is published with PROSPERO, reference number: CRD42015029698. It is also available to view in Appendix 7.

The search strategy was built using the PICO method.[105] The use of index and free–text terms relating to (i) MBSR/MBCT, (ii) health and social care was reviewed and approved by a qualified medical librarian.

The following databases were searched on 21st November 2016: PubMed, EMBASE, Psych Info, CINAHL, The Cochrane Library, and Academic Search Complete. No time restrictions were placed on the search. Additional search methods included hand searching key journals, scanning reference lists of papers, and contacting authors in the field. A sample database search is included in Appendix 8.

Titles and abstracts were screened (by MOD) to identify potentially relevant papers. Two independent authors (MOD and one other author, either LS or AMcG) then independently screened full texts, and extracted data from the relevant papers in relation to study design, participants, intervention, measurement tools and results. The Cochrane Risk of Bias Assessment Tool [106] was also independently applied by two reviewers (MOD and LS). A judgement of 'Low', 'High' or 'Unclear' risk of bias was allocated as appropriate (Appendix 9). The results of this assessment were used to moderate the findings of the review, rather than for inclusion/exclusion purposes.

Where opinions differed at any stage, consensus was reached through discussion, and a third party (SB) was consulted where necessary. A summary of study inclusion and exclusion criteria is given in Table 2.1.

Table 2. 1 Inclusion and exclusion criteria for systematic review.

PICO Category	Inclusion criteria	Exclusion criteria
Participants (P)	Studies whose participants are students of a healthcare undergraduate course	Studies where the results of populations other than health or social care undergraduates are included, and were not separable.
Intervention (I)	Studies investigating the delivery of an MBSR/MBCT intervention, or an intervention closely modelled on one of these	Studies delivering interventions that are not based on MBSR or MBCT
Control Group (C)	Studies that use a separate control group, either active, waitlist or passive.	Studies that use pre-post self-controlled design
Outcomes (O)	Quantitative results, or mixed methods where the quantitative results are separable from the qualitative.	Studies that give only qualitative results, or where the quantitative results are not separable from the qualitative.
Other	English language papers	Systematic reviews, meta-analyses, conference abstracts, editorials and commentaries

A narrative analysis was conducted as due to the heterogeneity of the studies a meta-analysis was not feasible.

2.4 Results

The initial search returned 8,148 results. Duplicate removal and title screening left 798 abstracts, 657 of which were deemed not relevant. The remaining 141 full texts were screened, giving 11 articles for inclusion in the systematic review (Figure 2.1).

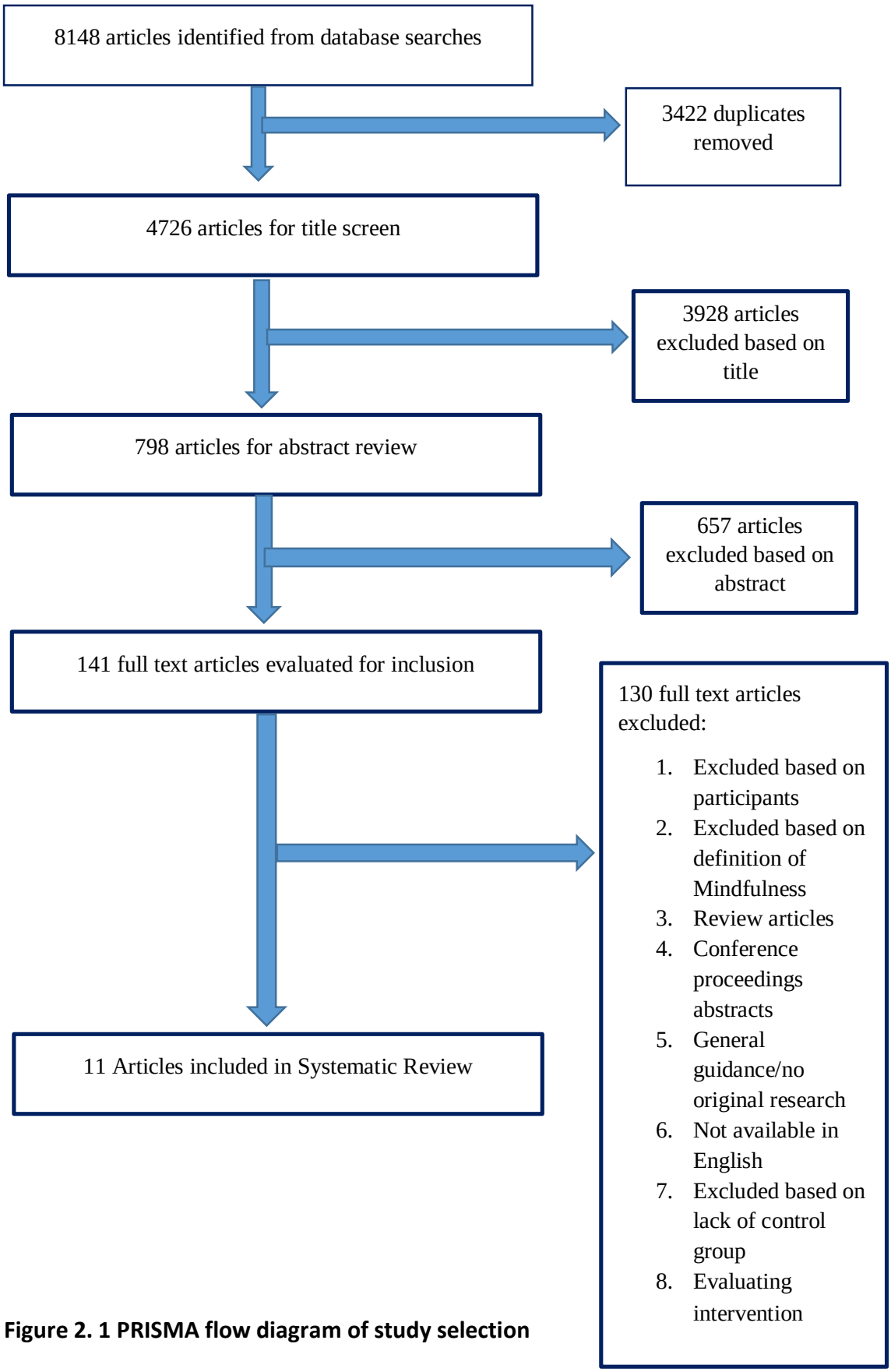


Figure 2. 1 PRISMA flow diagram of study selection

Table 2.2 Characteristics of included articles and risk of bias assessment (page 1 of 2)

Title/Author	Participants	Inclusion criteria	Intervention	Control Group	Measurement Tools	Outcomes of interest	Number of participants enrolled	Age (years)	Gender (%)	Risk of Bias[106]
Mindfulness training for stress management: a randomised controlled study of medical and psychology students – **de Vibe *et al*[64]**	Medical and psychology students in 2 universities, in their second or third term	not stated	MBSR shortened to six classes of 1.5hrs, 6hr retreat, and 30 min daily practice.	passive	General Health Questionnaire [70]	mental distress	288	23.8	F: 76%	Unclear
					Perceived Medical School Stress [107]	stress				
					Subjective Wellbeing [108]	wellbeing				
					Five Facet Mindfulness Questionnaire [82]	mindfulness				
					Maslach Burnout Inventory Student version [73]	burnout				
					Level of attendance	student compliance				
					Self-reported home practice	student compliance				
Does Personality Moderate the Effects of Mindfulness Training for Medical and Psychology Students? – **de Vibe *et al*** [109]	Medical and psychology students in 2 universities, in their second or third term	not stated	MBSR shortened to six classes of 1.5hrs, 6hr retreat, and 30 min daily practice.	passive	General Health Questionnaire [70]	mental distress	288	23.8	F: 76%	Unclear
					Perceived Medical School Stress [107]	stress				
					Subjective Wellbeing [108]	wellbeing				
					Five Facet Mindfulness Questionnaire [82]	mindfulness				
					Basic Characteristics Inventory [110, 111]	personality				
Mindfulness training improves problem-focused coping in psychology and medical students: Results from a randomized controlled trial – **Halland *et al*** [112]	Medical and psychology students in 2 universities, in their second or third term	not stated	MBSR shortened to six classes of 1.5hrs, 6hr retreat, and 30 min daily practice.	passive	Ways of Coping Checklist [113]	coping dimensions	288	23.8	F: 76%	Unclear
					Basic Characteristics Inventory [110, 111]	personality				
Abridged mindfulness intervention to support wellness in first-year medical students - **Erogul *et al* 2014** [114]	First year medical students in a university setting	had to attend retreat	MBSR shortened to eight classes of 75mins, half day retreat, and 20mins daily practice.	passive	Perceived Stress Scale [115, 116]	stress	58	23.5 yrs.	F: 45.6%	Unclear
		had to attend 7 out of 8 classes			Self-Compassion Scale [117]	self-compassion				
					Resilience scale [118]	resilience				
					Course evaluation	student compliance				
Mindfulness-based stress reduction lowers psychological distress in medical students – **Rosenzweig *et al*** [119]	Second year medical students	physical or mental status was not confirmed	10 weeks of MBSR, 90 minutes each, 20mins per day 6 days per week home practice, no mention of day retreat	active - seminar on complementary medicine	Profile of mood state [120]	mood, total mood disturbance	302	unknown	unknown	High
					Course participation survey	student compliance				
Effects of a Brief Mindfulness Meditation Intervention on Student Stress and Heart Rate Variability – **Shearer *et al*** [121]	Psychology students in a university setting	not stated	Based on MBSR - 4 1hr long weekly groups	active - dog therapy AND passive	Spielberg State Trait [122]	anxiety	74	unknown	F: 57%	High
					Five Facet Mindfulness Questionnaire [82]	mindfulness				
					Electrocardiogram	heart rate variability				
					PANAS positive and negative effect schedule [123]	mood				
					Becks Depression Inventory [124]	depression				

Title/Author	Participants	Inclusion criteria	Intervention	Control Group	Measurement Tools	Outcomes of interest	Number of participants enrolled	Age	Gender (%)	Risk of Bias [106]
Effects of mindfulness-based stress reduction on depression, anxiety, stress and mindfulness in Korean nursing students – **Song *et al*** [51]	Nursing students in university setting	no regular meditation or yoga in last 6 months no current psychiatric symptoms no physical contraindication to exercise no MBSR experience	standard MBSR, but no mention of 1 day retreat	passive	Depression Anxiety and Stress Scale [125]	depression, anxiety and stress	50	19.6 yrs.	F: 81.8%	High
					Mindful Awareness Attention Scale [126]	mindfulness				
					Demographic form	demographics				
Evaluation of a mindfulness-based stress reduction intervention – **Young *et al*** [127]	Third year nursing students	not stated	standard MBSR, but doesn't mention homework or day retreat	passive	Qualitative focus groups	not included in results	30	unknown	unknown	High
					SCL-90 and the MMPI [128]	stress				
					Antonovski's Orientation to Life Questionnaire [129]	sense of coherence, ability to respond to stressors				
Effects of mindfulness-based stress reduction on medical and pre-medical students – **Shapiro *et al*** [130]	Medical and premedical students	willingness to be randomly assigned to intervention or control	Based on MBSR - seven weeks of 2.5hr sessions, weekly home practice assignments, and daily journals	waitlist	Empathy Construct Rating Scale [131]	empathy	73	unknown	F: 56%	Unclear
					Hopkins Symptom Checklist 90 [128]	psychological distress				
					State-Trait Anxiety Inventory (Form Y) [122]	state and trait anxiety				
					Index of Core Spiritual Experiences [132]	spirituality				
					Daily journal	compliance				
					Evaluation packets	impact of the course				
					SCL-90 [133]	depression				
Effects of a brief mindfulness-based intervention program for stress management among medical students: The mindful-gym randomized controlled study - **Phang *et al*** [134]	First-third year medical students	at least 80% attendance at least 3-5mins daily practice	Adapted from and based on the principles of MBSR and MBCT - five 2hr classes	waitlist	Mindful Awareness Attention Scale [135]	mindfulness	75	21.14 (SD 1.1) intervention, 20.94 (SD1.17) control.	F: 70% intervention, 82% control	Unclear
					Perceived Stress Scale [68]	stress				
					General Self-efficacy Scale [136]	self-efficacy				
					General Health Questionnaire [70]	mental distress				
A pilot feasibility study of a peer-led mindfulness program for medical students - **Danilewitz *et al*** [137]	First and second year medical students	first 30 respondents to the email of invitation	MBSR - adapted to eight 1 - 1.5hr sessions, specifically for medical students	waitlist	Ease of recruitment	% of eligible participants recruited	30	unknown	F: 73.3%	Unclear
					Programme retention	% of participants who attended 4 or more lessons				
					Homework compliance	% of participants who completed homework				
					Depression Anxiety and Stress Scale [125]	depression, anxiety and stress				
					Jefferson Scale of Physician Empathy - Student version [76]	empathy				
					Self-Compassion Scale [117]	self-compassion				
					Adapted Altruism Scale [138]	altruistic behaviours				
					Satisfaction questionnaire - likhert scale	student satisfaction with course				
					Five Facet Mindfulness Questionnaire [82]	mindfulness				

Study characteristics and risk of bias assessment are summarised in Table 2.2. The most common risk of bias was un-blinded participants, although blinding of this intervention may arguably not be feasible. Other risks of bias were insufficient detail regarding randomization and outcome data. The overall risk of bias in all of the papers was deemed to be either 'unclear' or 'high.'

Students of nursing, medicine and psychology were represented in the included studies. Three papers described the same study,[64, 109, 112] but each reported on different outcomes. These papers analysed students from more than one degree programme (i.e. medicine and psychology), while the remaining eight papers studied one degree programme only.

Participant numbers varied from 30 to 293. The majority were female (up to 81%),[51] but gender was not detailed in two papers.[119, 127] The average age of participants ranged from 19.6 to 23.8 years, but was not recorded by five papers.[119, 121, 127, 130, 137]

Inclusion criteria detailed were: willingness to be randomized,[130] being enrolled in the course(s) in question, and adequate attendance.[114, 134] Exclusion criteria detailed were: previous exposure to MBSR, regular meditation or yoga in the previous six months, current psychiatric symptoms, or physical contraindication to exercise.[51]

While the standard MBSR course consists of eight weeks of approx. 2.5hr classes, daily home practice of 45mins, and a full day retreat during the 6th week, all studies in this review adapted this. Almost all studies deviated from the standard eight class course length,[64, 109, 112, 119, 121, 130, 134] class duration was shortened by all but three papers, [51, 127,

[130] and daily homework was either condensed or excluded by all but one paper.[51] Full day mid-intervention sessions were included in three papers.[64, 109, 112] One study delivered a half-day session instead.[114] Only one paper used the MBCT course as the basis for their intervention. [134] This may be due to the fact that MBCT is specifically designed to prevent relapse of depression.

In terms of control group design, one study used an active control,[119] and one used both an active and a passive control.[121] The rest compared mindfulness with a passive/waitlist control only. Shapiro *et al* subsequently explored replicability of results with the waitlist control group.[130]

All participants completed several tests pre and post intervention to detect an effect:

2.4.1 Health and wellbeing outcomes

2.4.1.1 Stress

Seven studies measured stress, using four different tools: Perceived Medical School Stress, the PSS, the Depression, Anxiety and Stress Scale, and the Symptom Checklist - 90.[51, 109, 114, 119, 127, 134, 137] One study showed no significant effect of the intervention on student stress (Hedges g 0.17, 95% CI −0.07, 0.40).[64] Another paper found that participants with higher baseline conscientiousness levels demonstrated decreased stress post intervention (p=0.01).[109] Phang *et al* showed that stress was significantly reduced immediately post MBSR (p=0.03, 95% CI 0.37, 6.89), but this reduction was not maintained after six months (p=0.08, 95% CI -0.37, 6.19). A negative association between stress and self-compassion, (r=-0.47, p = 0.001) and resilience (r=-0.5, p<0.001) was also

found in this study.[134] Danilewitz *et al* reported a significant reduction in stress in the intervention group compared to the control (p=0.019) [137] as did Song *et al* (p=<0.001). [51]

2.4.1.2 Mood

Several aspects of mood were reported. Song *et al* demonstrated differences in depression scores post intervention via the Depression, Anxiety and Stress Scale (8.3 versus 4.1, p=0.002).[51] In Shapiro *et al,* a significant reduction in depression scores was seen in the intervention group versus the control group (p<0.006) using the Hopkins Symptom Checklist. [130] The GHQ was used by de Vibe *et al,* who reported a significant overall effect of the intervention on mental distress compared to the control (Hedges g value 0.65, 95% CI 0.41, 0.88),[64] while in another study, the same authors combined this tool with the Basic Characteristics Inventory, showing that those with higher neuroticism obtained better results from MBSR (p=0.05).[109] Phang *et al* applied the GHQ and showed a significant decrease in mental distress scores (p=0.003) immediately post intervention, however, this was not maintained at six months (p=0.531).[134] The Profile of Mood State test showed decreased mood disturbance in the intervention group (p<0.05).[119] In pre-post tests for the intervention and control groups the results of the Becks Depression Inventory were not significantly different.[121] On the other hand, Young *et al* reported a large effect on psychological symptoms as assessed by the Symptom Checklist - 90 in the intervention group.[127]

2.4.1.3 Anxiety

Anxiety levels were assessed by four papers.[51, 121, 130, 137] Song *et al* used the Depression Anxiety and Stress scale, finding that mean anxiety scores were reduced in the intervention, versus no change in the control (p=0.002).[51] Shearer *et al* used the

Spielberg State Trait test to show that the intervention group, the active control and the waitlist control all demonstrated a decrease in anxiety and dysphoric affect scores.[121] Short term reduction of anxiety and dysphoria scores were identical, but long term follow-up showed a slight advantage for the intervention group. Shapiro *et al* used the State-Trait Anxiety Inventory, and reported lower, state anxiety ($p<0.05$) and trait anxiety scores (p,0.002) in the intervention versus the control[130]

2.4.1.4 Other measures

Two papers measured wellbeing using the Subjective Wellbeing test. One paper found a significant overall effect of MBSR (Hedges g 0.40, 95% CI 0.27, 0.63),[64] whilst the other found that improved wellbeing was positively correlated to neuroticism ($p=0.01$).[109] Two papers reported a significant increase in self-compassion ($p=0.23$, $p=0.024$ respectively) using the Self Compassion Scale,[114, 137] with one showing that the increase was maintained at six months (0.56, $p=0.001$, 95% CI 0.25, 0.87).[114] Danelwitz *et al* measured empathy using the Jefferson Scale of Physician Empathy Student Version, and found a between-group effect size of 0.21.[137] Shapiro *et al* found a significant increase in empathy levels, pre versus post intervention, via the Empathy Construct Rating Scale ($p<0.05$).[130] One study measured burnout using the Maslach Burnout Inventory, however reduction in burnout was not found to be significant (Hedges g 0.15, 95% CI −0.08, 0.38).[64]

2.3.2 Mindfulness levels

Mindfulness was measured in six studies.[51, 64, 109, 121, 134, 137] The FFMQ was most commonly used,[64, 109, 121, 137] with two studies using the Mindful Attention Awareness Scale.[51, 134]

Inverse relationships between FFMQ and neuroticism at baseline was found by one paper, however changes in mindfulness levels post MBSR were not reported.[109] Another study showed a significant increase in the non-reactive mindfulness facets.[64] Shearer *et al*[121] reported no increase in trait mindfulness, but the active control demonstrated an increase in non-judging behaviour. Song *et al*[51] reported an increase in mindfulness scores in the intervention group versus the control group (p=0.01). Danilewitz *et al* showed a significant change in the describing (p=0.05) and non-reacting (p=0.034) facets of mindfulness,[137] while improved MAAS scores in another study (p=0.04) were not maintained at six months (p=0.179).[134]

2.3.3 Effect of gender

De Vibe reported that student stress was significantly reduced by MBSR for females (Hedges g 0.25, 95% CI 0.02, 0.52), but not for males (Hedges g 0.17, 95% CI −0.32, 0.66). Females in the intervention group demonstrated a greater improvement in mental distress (Hedges g 0.72, 95% CI 0.45, 0.99) than males (Hedges g 0.33, 95% CI −0.16, 0.82).[64] Another paper by the same authors examined the links between gender and personality, discovering that women scored higher than men in the Basic Character Inventory for neuroticism (p<0.001) and conscientiousness (p=0.01) at baseline.[109] Halland *et al* showed that adjusting for gender and baseline scores revealed a significant

difference in avoidance-focused coping, (p=0.04) with no significant difference if this adjustment was excluded.[112]

2.4 Discussion

This review identifies and critically appraises the available evidence regarding the benefits of MBSR/MBCT for health and social care undergraduate students to date. Outcomes most commonly reported by the studies were stress, mood, anxiety and mindfulness levels, although interestingly, not all papers measured mindfulness. Secondary outcomes were burnout, wellbeing and empathy. Information regarding the types of standardized tools used to assess these outcomes was also examined in this review. The most commonly used tools were the FFMQ,[82] the GHQ[70] and the Subjective Wellbeing test.[108]

The UK Mindfulness All-Party Parliamentary Group published a report in October 2015, advising the introduction of mindfulness into national policy in areas including healthcare, education, and the workplace based on the strength of available evidence.[62] In general, this systematic review reflects their positive findings, albeit with noted limitations.

While the teaching of self-care or wellness to undergraduate healthcare students is a complex area, the consequences of burnout, compassion fatigue, and moral distress can range from personal crisis to suboptimal patient care practices.[139] Mindfulness could play a crucial role in developing at least some of the components of personal and professional wellbeing, namely social, occupational and emotional intelligence.[140]

Health and social care students are preparing for careers that report occupational hazards such as depression, anxiety, substance abuse and increased suicide rates.[39, 141, 142] There is a need to provide these students with mental training and support, in conjunction with their academic curriculum.

Gender has emerged as a factor which potentially affects the benefits achieved through MBSR. Females show more significant improvements than males post intervention. Furthermore, gender is reported to influence personality, which in turn impacts upon intervention success. However, the effect of gender was not described in eight of the 11 papers, and gender breakdown was not detailed in two of those. Hence, the evidence to substantiate these findings is limited.

None of the included studies delivered the MBSR in its standard form, highlighting the tendency of universities, often after consulting with students via surveys or focus groups, to shorten the course to increase accessibility and/or feasibility. It was noteworthy that despite these adaptations, sometimes halving the standard intervention length, significant results were still obtained by some studies; some alterations to the intervention do not seem to be detrimental to its effect. However, the question could be asked; did alteration of the intervention reduce its benefits in cases where significant results were not achieved? A balance between course effectiveness and accessibility for participants needs to be found.

While benefits in all of these areas are detailed by at least some of the studies, the issues of small sample sizes, varying study designs, and lack of long term follow-up prevent concrete conclusions being drawn, and limit the significance of the findings.

2.4.1 Limitations

There are a number of limitations associated with this systematic review. Firstly, only a small number of relevant studies were eligible for inclusion. The characteristics, methodologies, assessment measures and reported outcomes varied significantly between eligible studies, which hindered efforts to compare results across the studies. The overall risk of bias in this review is unclear. All 11 studies contain some risk of bias, due to issues such as participant blinding and selective reporting. This risk of bias assessment should be taken into account when interpreting the findings of the included studies. Furthermore, while the search strategy was comprehensive, one cannot rule out the possibility of relevant papers being overlooked. Sample size is an issue for some of the studies, with relatively small numbers of students agreeing to participate.

2.4.2 Future research

This review highlights several aspects of the current research that could be explored further in future studies.

As it stands, only a limited proportion of healthcare students (medicine, nursing and psychology) are represented in this area of research. Benefits for undergraduates of professions such as social care, dentistry, occupational therapy, physiotherapy and pharmacy were not explored. With the recent push for inter-professional learning in

healthcare, future research needs to recognize the common needs of *all* healthcare professionals, and represent this cohort more fully in participant selection.

Only two studies in this review used an active control. The face-to-face versus online delivery of MBIs to healthcare students could potentially be explored in the future. Participant numbers in the majority of studies were low, implying that accessibility may be a mitigating factor, and the convenience of an online course may counteract this.

This review highlighted that gender can impact upon the effectiveness of mindfulness training. Future research could potentially explore these and other factors further – who does mindfulness training suit best? A balance between accessibility and effectiveness of the intervention needs to be established.

Finally, while this review reported on the quantitative results of MBSR/MBCT interventions, qualitative studies could provide rich evidence in this particular field, and a future qualitative review is required to deepen our knowledge of the area.

2.5 Conclusion

The results of this review indicate that mindfulness could potentially improve student stress, anxiety, mood, wellbeing and empathy, providing students with a level of self-care conducive to the future provision of high quality patient care. Whilst issues in terms of small sample sizes and varying study designs prevent concrete conclusions being drawn, this review could serve as a platform upon which to base future research.

2.5.1 Acknowledgements:

We would like to acknowledge the assistance of Mr. Joe Murphy, medical librarian in Mercy University Hospital, Cork, who assisted with search strategy design.

2.6 Updated search

Due to the length of time that had passed since this review was published, and the growing level of ongoing mindfulness-based intervention research, it was decided to update the search for the purposes of this thesis.

The updated search was conducted in October 2018, and initially 30 abstracts were identified for full-text screening. Further investigation of these full-texts led to just one additional paper being deemed eligible for inclusion in the updated search.[143] This paper was a six-year longitudinal follow-up of the original study already described in this review by de Vibe *et al,*[64] hence general study characteristics and risk of bias assessment are as described earlier.

The follow-up period of this study included twice-yearly mindfulness booster sessions for the intervention participants, who were analysed at two, four and six years post-intervention using the FFMQ,[82] the Ways of Coping Checklist. Analyses,[113] as well as four measures of wellbeing.[144] Participants were also asked questions about the regularity of their formal mindfulness practice since the intervention.

At the six-year follow-up, students receiving mindfulness training reported increased well-being, and greater increases in the trajectory of dispositional mindfulness and problem-focused coping, which predicted increases in wellbeing. They also

demonstrated greater decreases in the trajectory of avoidance-focused coping. Reported adherence to formal practice was low, yet these significant effects were still found.

This paper is the first of its kind to carry out such long-term follow up, and its results are promising for the maintenance of significant results at such extended intervals post-intervention. Its findings are contrary to those of similar studies which have not maintained the effect of their interventions at much shorter follow-up intervals.[114, 134] This may be due to the excessively condensed nature of those interventions, which again brings us back to the question of balance between duration/accessibility of the intervention versus effectiveness.

Chapter 3: Health and social care undergraduate students' experiences and perceptions of mindfulness-based interventions: a systematic review of the qualitative literature

This chapter is currently under review in *Mindfulness.*

Authors: **O'Driscoll M,** Byrne S, Lambert S, Sahm LJ.

3.1 Abstract

3.1.1 Aim

To synthesise the qualitative evidence available on the experiences and perceptions of health and social care undergraduate students of taking part in MBIs.

3.1.2 Design

A systematic review was undertaken, applying a thematic synthesis approach to the eligible qualitative studies.

3.1.3 Data sources

The following databases were searched from inception to September 2018: Pubmed, PsychInfo, Embase, CinAHL, Academic Search Complete and the Cochrane Central Register of Controlled Trials (CENTRAL). Reference searches and citation tracking was also conducted.

3.1.4 Review methods

Studies that met the following criteria were eligible for inclusion: (i) used qualitative data collection and analysis methods; (ii) delivered a mindfulness intervention that was based on MBSR or MBCT; (iii) participants were undergraduate health or social care students; (iv) full text was available in English. The quality of included studies was appraised independently by two reviewers using the Critical Appraisals Skills Programme (CASP) checklist. A thematic synthesis was conducted to generate analytical themes.

3.1.5 Results

Of the 7,877 records identified for screening, four studies were eligible for inclusion in this review. The following analytical themes emerged: (i) understanding and engagement, (ii) benefits - from aim to attitude (iii) barriers and facilitators, and (iv) individualised integration.

3.1.6 Conclusions

This qualitative systematic review has explored the effects of MBIs on health and social care undergraduate students, and their experiences of participating in such interventions. Findings suggest that the level of student engagement with and understanding of, mindfulness determines the depth of benefit that they experience, from superficial goal-attainment to a deeper shift in attitude. Further research is required to elucidate the key to successful integration into existing programmes. The factors identified in this review should inform the design and implementation of future interventions.

3.2 Introduction

The prevalence of mental health disorders in young people worldwide is growing, including within the university setting.[16, 95] In particular, health and social care undergraduate students have been identified as being at risk of significant stress, due to challenging undergraduate degree programmes.[92] The pressures of multiple deadlines, full timetables, and in many instances, patient care can adversely affect health and wellbeing of the student themselves, through the development of anxiety, depression and burnout. [93, 94] There is also an increasing research focus on the negative impact of working in healthcare professions.[96] This can lead to poor decisions and medication errors leading to poorer outcomes for patients..[97]

Although self-care and wellness are increasingly being viewed as essential components of undergraduate healthcare education,[145] the best way to deliver such training has yet to be confirmed.[98] It has been argued that more interventions are required in order to improve mental health outcomes within the education sector.[99]

Mindfulness has been defined by Dr. Sharon Salzberg as *"a practice of paying attention in a way that creates space for insight,"* allowing awareness to follow thoughts, feelings and sensations as they arise,[146] thus facilitating clearer thought processes and decision making.[46] Although its roots lie in Buddhism, mindfulness as a secular concept was first introduced to the Western world in 1979 by Dr. Jon Kabat-Zinn. He designed and delivered an eight-week course, MBSR for patients with chronic pain. While no treatment could successfully eradicate their pain, participation in this course positively changed how they related to it.[48] The therapeutic potential of this approach was recognised, and MBSR was subsequently

combined with CBT to form MBCT a therapy currently recommended by the NICE guidelines for the prevention of relapse of recurrent depression.[49]

The demonstrated benefits of mindfulness in both clinical and non-clinical settings are significant,[52, 147] with structural changes in parts of the brain associated with planning, problem solving and emotional regulation found.[103] The application of mindfulness to the university setting in particular is producing promising results, with large-scale studies being government-funded and rolled out in recent years.[64, 148, 149] This has been largely due to the key recommendations made in 2015 by the Mindful Nation UK Report, which advised that due to the extent and quality of findings to date, mindfulness should be prioritised and developed in the workplace, healthcare, education and prison settings.[150]

While extensive research has been conducted into the quantitative effectiveness of MBIs using a variety of validated tools,[1, 68, 70, 72, 151] the importance of the role that qualitative research can play in this area is still developing, and should not be underestimated. Qualitative data has an ability to; explore phenomena that quantitative research may miss; offer a deeper insight into the experiences and perceptions of participants; add an extra dimension on which to base interpretation of quantitative data.[152-154] Qualitative studies have been undertaken to investigate the experiences and perceptions of undergraduate health and social care students of taking part in mindfulness-based interventions, but to date, no systematic review of this literature has been conducted.

The aim of this systematic review is to synthesise the available qualitative research on health and social care undergraduate students' experiences and perceptions of mindfulness-based interventions.

3.3 Methods

Details of the protocol for this systematic review were registered on PROSPERO and can be accessed at CRD42018112842. They have also been included in Appendix 10.

3.3.1 Search strategy

The following databases were searched from inception to September 2018: Pubmed, PsychInfo, Embase, CinAHL, Academic Search Complete and CENTRAL. The initial search had no language or time constraints. The search strategy was devised by the primary researcher under the guidance of a qualified medical librarian, using index and free-test terms related to MBIs and undergraduate health and social care students. Hand searching of reference lists, citation tracking of included studies, and personal knowledge were also applied to ensure that no relevant studies had been inadvertently omitted.

3.3.2 Study selection

After removing duplicates, titles were checked for eligibility using Endnote by the primary researcher (MOD). Abstracts were then screened, and remaining full-texts were independently assessed by two reviewers (MOD and LS) according to pre-determined inclusion and exclusion criteria. Where any disagreement arose, consensus was reached by discussion, involving a third reviewer (SB) where required.

3.3.3 Eligibility criteria

Studies that met the following criteria were eligible for inclusion:

(i) qualitative data collection and analysis methods;

(ii) delivery of a mindfulness intervention that was based on MBSR or MBCT;

(iii) participants who were undergraduate health or social care students;

(iv) full text was available in English.

Where mixed methods were part of the original study, only the qualitative data was included in the review. It was decided that for surveys to be included, they had to be qualitative in nature to reflect the nature and depth of a qualitative review.[155, 156] Systematic reviews, meta-analyses, editorials, commentaries and conference abstracts were excluded, as were interventions delivered to students enrolled in postgraduate courses, or those to qualified healthcare professionals.

3.3.4 Data extraction

Data from included studies were extracted by one reviewer (MOD) under predefined headings relating specifically to general characteristics and intervention characteristics, and these were independently verified by a second reviewer (LS). Disagreements were resolved through discussion until a consensus was reached.

3.3.5 Quality appraisal

The included studies were independently assessed for quality by two researchers (MOD and LS) by applying the Critical Appraisal Skills Programme (CASP) tool for Qualitative research.[157] Any disagreements were discussed and resolved with a third reviewer (SB). Although this appraisal was used to moderate the findings of the review in terms of rigour and quality of the research,[158] it was not used to decide

upon study inclusion or exclusion, due to ongoing debate about its appropriateness to be used in this way.[159]

3.3.6 Data synthesis

Data from the eligible studies in this review were synthesised using the thematic synthesis approach. As discussed by Thomas and Harden,[84] this method allows the reviewer to remain true to the data, synthesising it in a transparent way, while allowing for the generation of new concepts and themes that go beyond the original findings of the studies. The thematic synthesis approach involves three key steps;

(i) line-by-line coding was applied to all text labelled "results" or "findings" of a qualitative nature in the included studies;

(ii) descriptive themes were generated by grouping the generated codes together;

(iii) analytical themes were created as a result of the descriptive themes identified.

QSR International's NVivo 11 was used to aid the synthetic process. All of the above steps were conducted independently by two reviewers (MOD and LS), with discussions to reach consensus, and involvement of a third reviewer (SB) where required. Several group discussions confirmed the final analytical themes presented. This systematic review is reported in accordance with the Enhanced Transparency in Reporting the Synthesis of Qualitative Research (ENTREQ) guidelines, as detailed in Appendix 11.[160]

3.4 Results

3.4.1 Study selection

The initial database search identified 13,334 articles, of which 5,457 were duplicates. From the remaining 7,877 articles, the screening process led to a further 7,365 being excluded. The remaining 512 abstracts were checked for eligibility, and 495 were discarded. The resulting 17 full-texts articles were reviewed to identify those that met the inclusion criteria for this review. No additional texts were found through hand searches or citation tracking. Therefore, four articles were included in the systematic review. Figure 3.1 outlines the study flow during the selection process.[104]

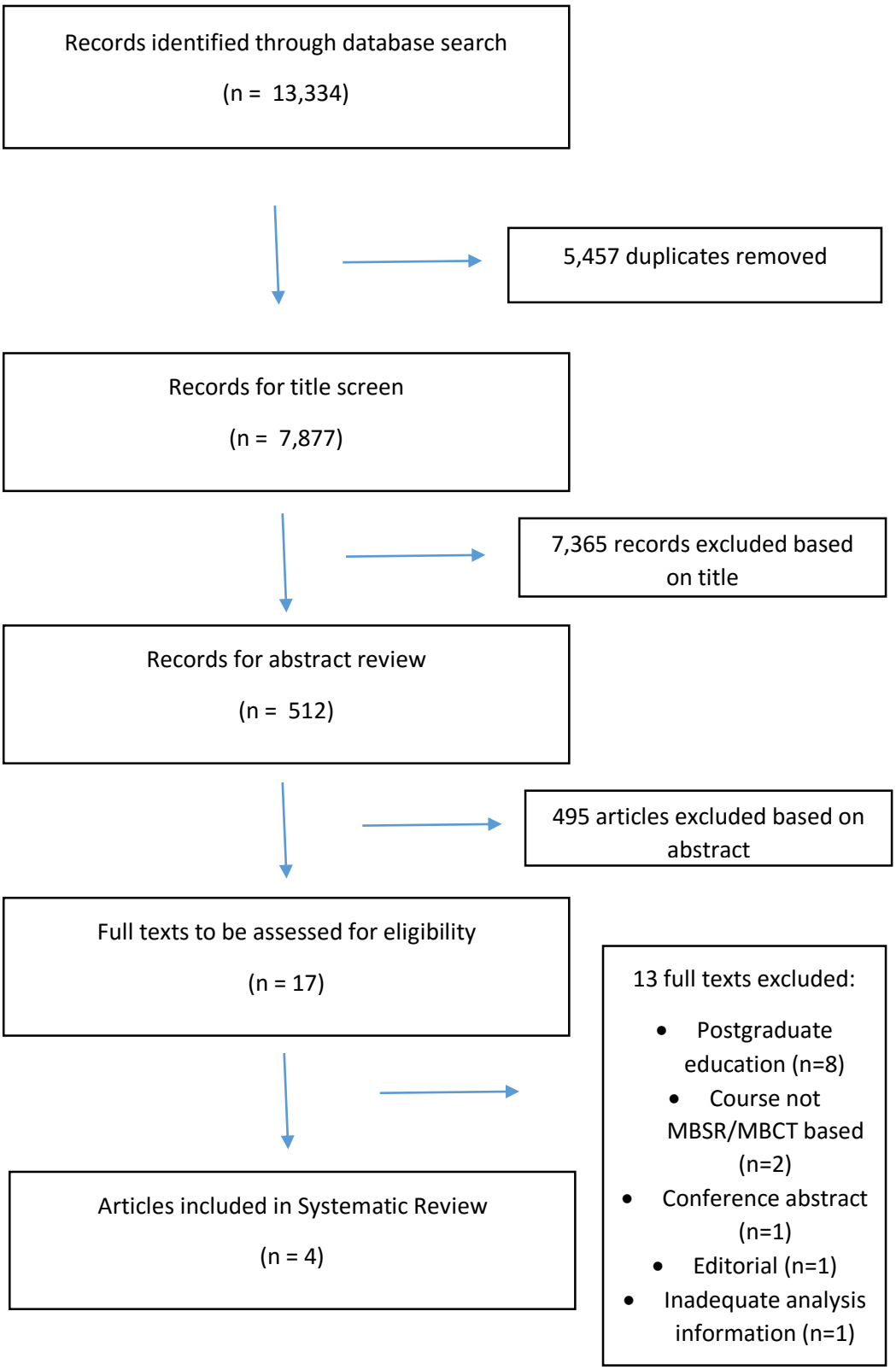


Figure 3.1 PRISMA flow diagram of study selection

3.4.2 Study characteristics

Included studies were conducted in Ireland,[161] Northern Ireland,[162] Norway[65] and Australia.[163] The cohorts investigated were medicine,[65, 161] psychology,[65] social work,[162] nursing and midwifery[163] undergraduate students. Participant numbers ranged from 14 to 123. Data collection methods employed were open-ended questionnaires,[161, 162] interviews[65] and focus groups[65, 162, 163]. All but one paper[65] analysed their data thematically. All four studies based their intervention on MBSR, but condensed this down to varying degrees.[65, 161-163] Students were offered either six[65, 162] or seven classes,[161, 163] with class length varying from one to two hours in duration. All studies detailed some sort of home practice, although in an informal format,[65, 161-163] and only one study included the day of mindfulness that features in the original MBSR course.[65] Table 3.1 summarises the general characteristics of the included studies, and Table 3.2 details the intervention characteristics.

Table 3. 1 General study characteristics

Reference (Year)	Location	Participants (n)	Method	Analysis	Aim
Aherne *et al.* (2016)[161]	Republic of Ireland	First (n=88) and second (n=35) year graduate entry medical students	Open-ended feedback questionnaire	Thematic analysis	To examine the perceptions of an MBSR programme, and to compare the use of a compulsory versus an optional approach to participation on these perceptions in order to inform future delivery of self-care courses.
Roulston *et al.* (2018)[162]	UK Northern Ireland	Undergraduate social work students (n = as per Table 1 n=30 (15 in intervention and 15 in control group))	Focus group and open-ended feedback questionnaire	Thematic analysis	To measure the impact of a mindfulness course on the mental wellbeing, stress and resilience of undergraduate social work students in Northern Ireland
Solhaug *et al.* (2016)[65]	Norway	First year, psychology (n=11) and medical (n=11) students	Interviews and focus groups	Interpretive phenomenological analysis	To examine how students understand concepts and purposes of mindfulness practice; how this understanding contributes to the process of learning mindfulness; and the meaning students ascribe to mindfulness with regard to intra- or interpersonal life domains relevant for becoming healthcare professionals.
van der Riet *et al*. (2014)[163]	Australia	First-year nursing and midwifery students (n=10)	Semi-structured focus group	Thematic analysis	To explore the impact of a seven-week stress management and mindfulness program as a learning support and stress reduction method for nursing and midwifery students.

Table 3. 2 Intervention characteristics of included studies.

	No. of classes	Class length	Class content	Daily homework	Retreat	Facilitator(s)
Aherne *et al.* (2016)[161]	7	1 hour for 1st years 2 hours for 2nd years	based on MBSR – emphasis on experiential aspect	formal and informal practice, to be logged and submitted at the end of the course	none described	freelance psychotherapists trained in mindfulness, under the supervision of a Clinical Psychologist with 25 years of mindfulness experience.
Roulston *et al.* (2018)[162]	6	2 hours	based on MBSR - both didactic and experiential elements	encouraged to apply meditative practises daily	none described	accredited to use MBSR, over 25 years of experience
Solhaug *et al.* (2016)[65]	6	1.5 hours	based on MBSR	20-30 minutes per day	6 hours	six facilitators trained to deliver MBSR (as per de Vibe 2013)[64]
van der Riet *et al.* (2014)[163]	7	1 hour	based on MBSR - didactic and experiential elements	encouraged to practice the exercises regularly at home in between formal sessions.	none described	counsellors with many years of personal experience in mindfulness and the professional delivery of mindfulness courses.

Table 3. 3 Quality appraisal of included studies using the Critical Appraisal Skills Programme (CASP) Qualitative Research Checklist.

	Aherne *et al.* (2016)[161]	Roulston *et al.* (2018)[162]	Solhaug *et al.* (2016)[65]	van der Riet *et al.* (2014)[163]
Clearly stated aims?	✓	✓	✓	✓
Qualitative methodology appropriate?	✓	✓	✓	✓
Appropriate research design?	✓	✓	✓	✓
Appropriate recruitment strategy?	✓	✓	✓	**U**
Data collection?	**U**	**U**	✓	**U**
Reflexivity?	**U**	**X**	✓	✓
Ethical issues considered?	**U**	✓	✓	✓
Rigorous data analysis?	**U**	**U**	✓	✓
Clear statement of findings?	✓	✓	✓	✓
Value?	✓	✓	✓	✓

Legend: ✓= Yes, X = No, U = Unclear

3.4.3 Quality appraisal

A summary of the quality appraisal of included studies is provided in Table 3.3. All studies presented a clear statement of their aims, employed an adequate qualitative research method, described an adequate research design, and clearly presented their findings.[65, 161-163] All papers also confirmed that ethical approval was sought and granted, while one study was unclear on their recruitment strategy, and who participated in their focus groups.[163] Data analysis was not clearly described in two studies,[161, 162] particularly in relation to numbers of independent coders and resolving of disagreements. Reflexivity (i.e. the relationship between researcher and participants) was not clearly addressed by one paper,[161] while another failed to acknowledge its role in data generation and analysis.[162] Three studies did not provide enough detail to assure the quality of data collection.[161-163] Overall, two studies were deemed to be valuable in terms of their contribution to the research,[65, 161] while the value of the other two papers was categorised as "*unclear*," due to the fact that they were pilot studies.[162, 163]

3.4.4 Analytical themes

The following four analytical themes were generated from the analysis, (the conceptual model and relationship between these themes is illustrated in Figure 3.2):

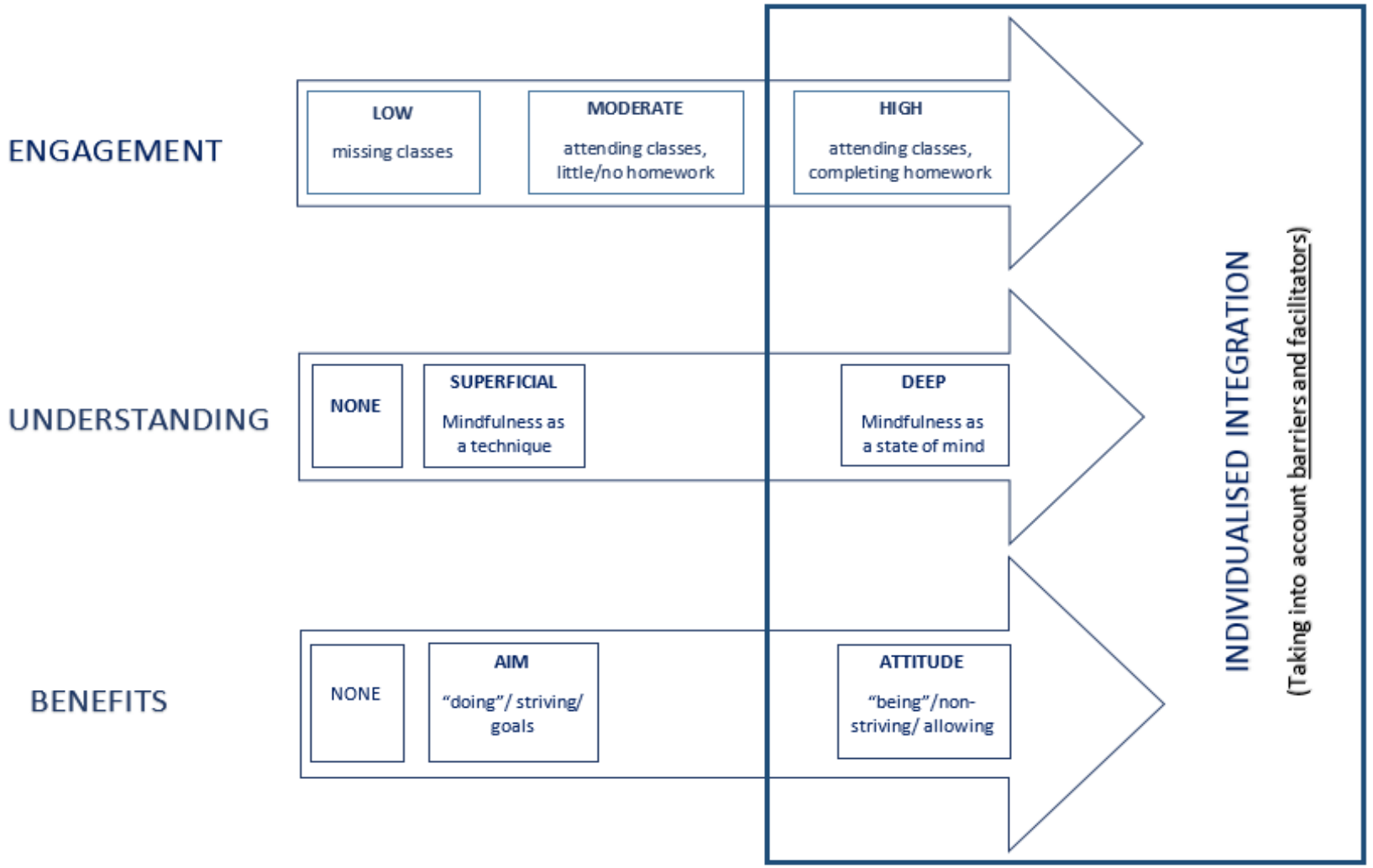
(i) understanding and engagement;

(ii) benefits - from aim to attitude;

(iii) barriers and facilitators and

(iv) individualised integration.

Figure 3. 3 Thematic synthesis results



3.4.4.1 Understanding and engagement

The levels of understanding that students attained in relation to the concept of mindfulness, and the amount of engagement that they demonstrated through course attendance and home practice was a key theme that emerged across all studies.[65, 161-163] They are presented here as two interconnected sub-themes.

3.4.4.1.1 Understanding

Understanding of the concept of mindfulness varied greatly both between and within studies. One student eloquently summarised this notion; "*everybody has different thoughts on what it is…there is not one single way of defining mindfulness, and therefore…the meaning, will vary*."[65] Especially in the beginning of their respective MBIs, students reported finding mindfulness to be a bit "*hippie*,"[161] or to be a "*mystical*" or "*alien*" concept.[162] As their participation in the course progressed, it was found that their level of understanding developed to varying degrees.[65, 161-163] These levels of understanding are described in detail by Solhaugh *et al*. as ranging from mindfulness being viewed as "*a technique*", to mindfulness being considered a "*state of mind*." or "*way of life*."[65]

All included studies described instances of students developing at least a basic understanding of the concept of mindfulness.[65, 161-163] This most basic level of understanding was grounded in the idea of mindfulness being a way to "*achieve a desired state, such as relaxation, calmness, or self-confidence, or a tool with which to improve concentration, attention, and performance*"[65] While Roulston *et al.* noticed a gradual increase in participant understanding,[162] van der Riet *et al.* reported very little understanding of the concept past this initial superficial level.[163] Aherne *et al*

found that a basic level of understanding was what most of their first year students attained, and that their second year participants eventually developed a deeper comprehension of the concept; "*I learned/understood more about mindfulness this year vs. last*."[161] In contrast, Solhaug *et al.* described encountering a full range of understanding, from students describing mindfulness as being "*a bit like mental training that I have been doing in biathlon, to be present, focus on your tasks and do things right*," to recognising it as a "*more coherent*" concept that "*included several non-competing components such as self-insight and self-care, non-reactive awareness, and improved listening ability*." In this deeper level of understanding, students recognised mindfulness as being a way to change how they relate to stress, rather than a method to actively "*manage*" it; a subtle, yet crucial difference.[65] These varying levels of understanding often co-existed, causing confusion amongst participants due to their seemingly contradictory nature. This confusion was evident in the comment of one student, who described the goal of mindfulness as being "*getting better experiences…At least when it comes to external matters, perhaps, or I don't know…that you might learn to control your breath in a way and maybe not control your thoughts but be more aware.*"

3.4.4.1.2 Engagement

Student engagement, specifically in course content and daily practice, also varied across the four studies,[65, 161-163] and was directly linked to levels of understanding. Roulston *et al.* found that when "*mindfulness made more sense…students felt more comfortable engaging in the exercises."*[162] In contrast, those who "*remained sceptical…confessed that they had been less committed to the homework tasks.*" Solhaug *et al.* drew a similar conclusion; "*students who reported a more comprehensive understanding of mindfulness seemed to be more engaged in practices…conversely, students who took a more instrumental approach to reaching specific goals, such as improved relaxation and concentration…reported less engagement in the practices*."[65] Van der Riet *et al*. reported that although participants engaged in "*moments of increased awareness and mindfulness interspersed throughout the day",* they did not complete formal "*homework*" to the extent that they had been encouraged to do so.[163] Aherne *et al.,* who directly compared first and second year students' engagement, reported that many first years found the course "*frustrating*" and "*difficult*," and did not engage fully. Second year students on the other hand did not highlight any specific difficulty with engagement, possibly due to their experience of mindfulness in previous years and therefore a better understanding of what it was. It was also postulated that engagement required an attitude of receptivity, which the optional status of the course in second year cultivated, rather than the forced nature of the compulsory first-year sessions; "*you need to be open to it to get the most out of it."* [161]

3.4.4.2 Benefits - from aim to attitude

Intrinsically linked to the level of understanding and engagement reported by students was the type of benefit that they subsequently experienced as a result of taking part in the mindfulness courses, from specific accomplishments of "*aims*" or goals, to a more complex shift in "*attitudes*," and ways of relating to life in general. This theme was presented by all four studies to varying degrees.[65, 161-163]

The benefits described by the included studies began with a common foundation of goal-orientated, or "*doing-mode*" benefits such as better sleep, improved ability to study,[163] stress management,[161] increased focus and dealing better with assignments or placements.[162] One student described how they used mindfulness in this way; "*If you stress you are not going to get anything done, you are not going to remember anything. You are better off doing an hour's calm study rather than just rushing it*." Another student added, "*I had many problems with sleeping. It was really, really helpful, which made me study and focus so much better the next day…mindfulness helped sleep, helped study and…I really found it useful for that one thing*."[163]

For some participants, these "*aim*"-orientated benefits gradually developed into more "*attitude*" based ones; While Aherne *et al.* did not provide great detail about the specific benefits that students experienced, they did demonstrate a general progression in benefits from "*aim*" to "*attitude*" from first to second year, mapping directly onto students' engagement and understanding levels.[161] While van der Riet *et al.* described benefits which were mainly "*aim*" orientated, with only short references to shifts in "*attitudes*," such as "*acceptance of what is*,"[163] Roulston *et al.* experienced a higher frequency of attitudinal changes among their participants, for

example, "*one student acknowledged how her attitude towards stressful situations such as 'being late' had changed, and she can now enjoy life in the present.*"[162]

The paradox of *"aim"* and *"attitude,"* the journey from one to the other and the conflict between the two were all explored in detail by Solhaug et al.[65] This study found that basic goal-related benefits frequently developed into more complex attitudinal shifts, often to the surprise of the participants in question. It was reported that *"some participants, who initially just aimed to improve their concentration or learn about a tool for relaxation, seemed to transcend these objectives as part of the process of becoming increasingly aware of their mental habits... such increased awareness appeared to facilitate spontaneous questioning of the validity of thoughts and beliefs"*. Rather than simply "managing" stress, participants were increasingly able to *"facilitate cognitive reappraisal of stressful situations."* The study also described participants' ability to turn towards difficulty, which often caused them to lessen in intensity, and to become more manageable.[65]

The benefits of "*aims*" and "*attitudes*" often co-existed almost in juxtaposition to one another. Participants reported: "*even while acknowledging ideas of non-striving and acceptance as central to the mindfulness approach, such ideas seemed to compete with more instrumental aims of improvement and control*." This confusion possibly arose from students "*combining their conceptualization of the method ('stay focused') and aims ('become aware of unhelpful thoughts').*"[65]

3.4.4.3 Barriers and facilitators

Elements of the MBIs that students felt either facilitated or negatively affected their participation was a key theme in two of the four studies.[161, 163] The other two papers did not present findings relating to specific barriers or facilitators identified by participants in any great detail.[65, 162]

The timetabling of the course for students was identified as an important consideration. Aherne *et. al* found that first year students in their study disliked the timing of the course, specifically at the end of a busy day. One student voiced the opinion that "*winding down in the middle of the day is not ideal for a med student*," while another felt that they "*would have been more receptive to the course had it been on another day.*"[161] Both studies found that undesirable scheduling contributed to students feeling that "*being forced into assessing your stress while stressed is quite stressful*."[161] One student noted "*I'd asked…is there any other time I can do it*."[163] Better scheduling would allow students to be "*more receptive*," and facilitate them "*engaging fully*" with the content. Van der Riet *et al.* described ways in which they made preliminary attempts to aid students in this struggle to attend, and responded to a "*request that sessions be recorded…thus, where a student was unable to attend, they could review the session in their own time*."[163]

A suitable session environment was found to be integral to successful delivery of the MBI. A "*safe environment*" was important to students,[161] and facilitated better engagement. One student said "*my program doesn't allow us to take time out for ourselves, so it was beneficial to do so in a safe environment.*" Factors such as tutors

that "*set the tone*", and "*adapted the course*" accordingly,[163] and a group that fostered a sense of "*trust*" and developed a supportive "*bond*"[161] contributed to this sense of safety. Venue was also an important consideration; van der Riet *et al*. found that the room where their MBI was delivered was "*cold, noisy and uninviting*." This, coupled with an "*arrangement of the room and seating of participants which did not support a sense of group cohesiveness*." was jarring for participants.[163] One participant described their desire to feel "*connected*," suggesting "even *if you moved the tables away and we all had to sit on the floor or in a big round circle*," then the experience would have been improved.[163]

A contentious issue that was identified as both barrier and facilitator by Aherne *et al.* was making the course compulsory. The first year cohort of this paper were obliged to participate in the MBI, and this was cited as a source of "*particular discontent among the students, with many feeling that this is "counterproductive" and that a willingness to engage in mindfulness is essential - it cannot be forced*."[161] Furthermore, compulsory attendance was identified as having a "*negative effect on some individuals who then disrupted their fellow classmates*."[161] This was in direct comparison to the second year students in this study, who attended by choice, and with whom "*the issue of mindfulness being "mandatory" or "forced" did not arise*."[161] As acknowledged by several of the studies, mindfulness "*is not for everybody,*"[162] and this should be taken into account when weighing up the options of compulsory versus optional attendance.[161, 162] However, considered in tandem with the benefits obtained by participants in this study, second years achieved a deeper understanding and overall level of benefit from the course; while this may be because they were

attending by choice, it may also be due to the fact that they were building upon what they had learned in first year. In this respect, the compulsory nature of the course in first year may have been instrumental in targeting and nurturing the learning achieved by those whom the course suited best.

3.4.4.4 Individualised integration

This theme explores the role that MBIs should play as part of future undergraduate healthcare curricula, and it emerged strongly from two of the included studies.[161, 163] It sought to explore where students felt mindfulness should sit, and what it should look like. The remaining two studies conducted very little exploration of this theme, if any.[65, 162]

Despite mindfulness being welcomed as a concept in general, it emerged from the studies which expanded upon this theme that participants wished to explore the option of a course that was not necessarily exclusively mindfulness-based, but rather one that combined "*mindfulness exercises, physical exercises, and other activities for reducing stress*." One student voiced this opinion, saying that "*forcing people to try to relax in a particular way is ridiculous given the different methods people use to relax. Weeks would be much better spent sampling a number of different relaxation methods*."[161] This would acknowledge students' individual coping preferences, and empower them to experiment with these in a supportive setting.

It was evident that there was a contrast between students' desire to cover more about the "*anatomical*" nature of what they were learning through didactic teaching,[163] versus wanting more experiential stress reduction exercises instead.[161] van der Riet *et al. found* that while the experiential components were deemed by students to be the most helpful, they also wanted to "*relate the two [theory and practice] and understand it*."[163] Furthermore, they requested a more extensive support base to draw upon as part of the course, including "*a clear overview of the program, a workbook that detailed the overall structure, content incorporating the didactic material and each of the mindfulness practices to support between session practices*."[163] Aherne *et al.* echoed the preference for experiential-based learning; "*The course would be better if we actually spent time practising stress relieving techniques instead of simply discussing them*."[161]

Overall, it was felt that with a clear focus on individualising the course offered, mindfulness does have a place within undergraduate healthcare education.[161-163] Some participants felt that it was "*important…to introduce it to students*", and that it played a "*vital role*" in their future professions,[162] while others wanted to implement their recommendations, and then '*do the course again and invite us all*'.[163]

3.5 Discussion

This systematic review synthesised the qualitative evidence available on the experiences and perceptions of undergraduate health and social care students of taking part in MBIs. All four of the included studies explored the themes of "*understanding and engagement*," and "*benefits - from aim to attitude*" to varying degrees.[65, 161-163] Two of the papers further expanded their scope to also examine "*barriers and facilitators*" and "*individualised integration*" as part of their findings.[65, 162]

The recent phenomenon of "*McMindfulness*," where mindfulness has been marketed widely as a quick-fix for all of life's challenges[164] has contributed to some misconceptions of this research area.[164] A combination of low-grade interventions marketed as MBIs, and fear of the unknown culminate in poor understanding of and engagement with good quality interventions.[162, 165] As a result, studies are often hindered by low recruitment numbers and high drop-out rates.[127, 137] This review highlights the fact that a better understanding of the concept of mindfulness is integral to participant engagement, particularly in relation to attendance rates and daily home practice. Participants who had a better understanding of what mindfulness was were more likely to demonstrate higher engagement in the classes and home practice, both during the intervention, and in the time following it.[65, 161-163] This is an important issue to identify, as it allows for strategies to be implemented as part of future research; introductory sessions that present the scientific evidence-base for such interventions, with an opportunity to sample the techniques first-hand have been used effectively by some studies, and warrant further investigation.[64]

Directly linked to understanding and engagement is the level of benefit that participants experienced as a result of taking part in the MBI. Dr. Shauna Shapiro, a senior mindfulness researcher says that mindfulness comprises of three distinct, yet intertwined areas; attention, intention and attitude.[166] The "*attention*" component is evident as an increased ability to concentrate and focus on a given task. The "*intention*" aspect is seen when one "*intentionally*" chooses to let go of negative thoughts. "*Attention*" and "*intention*" in combination provide basic benefits that are "*aim*" or goal-orientated. Although these benefits are not always necessarily predicted by participants, and were considered surprising by some of the included studies, e.g. better sleep.[163] They are nonetheless associated with "*doing*" or "*fixing*." However, the greatest benefits of mindfulness require an addition of the "*attitude*" component; this creates a more complex shift in how the person relates to daily life; to stress, challenges and negative emotions. This deeper level of benefit was considered by some participants to be paradoxical in nature; they found that "*turning towards*" difficult emotions or situations, often caused them to lessen in intensity, and to become more manageable. This review found a clear link between levels of understanding/engagement, and the depth/type of benefits reported. Studies which reported a deeper level of understanding of the concept of mindfulness reported greater benefits.[65, 162] While all included studies demonstrated "*aim*" related benefits to some degree,[65, 161-163] greater understanding and engagement levels were required for those deeper "*attitudinal*" benefits to become apparent. It is also worth considering too that psychology students who took part in the intervention described by Solhaug et al. may have understood the concept of mindfulness and engaged with

it better due to the nature of their degree programme. This in turn may have increased the benefits they reported.[65] These findings are important in explaining the underwhelming results of so many MBIs,[121, 167] and further highlights the need for a strong recruitment strategy.

With such a variety of MBIs now in use, it is difficult to determine the best intervention methods to use, and to pinpoint the barriers and facilitators of such interventions. The qualitative nature of this review was useful in this regard, as it allowed an in-depth exploration of participants' perceptions of the interventions in which they had taken part.[153] Barriers such as unsuitable timetabling, undesirable venue and inadequate room setup were cited as hindering engagement, while a good group dynamic and capable tutor were seen as important facilitators of the learning.[161, 163] These findings are similar to those of previous studies, where creating the correct environment for participants was seen as a fine balancing act.[168] It is important to weigh up the barriers versus facilitators i.e. poor group dynamic due to compulsory attendance versus ensuring that those who would benefit the most are given every opportunity to engage with the course.

This finding is intrinsically linked to the theme of individualised integration, which recognises that no two groups are the same; what is effective for one cohort may not be welcomed by another. This review has illustrated that although MBIs alone are effective to varying degrees, some undergraduate health and social care students expressed a desire for mindfulness to be made a part of a larger suite of stress

management techniques. It is imperative that interventions are tailored to their participants needs; requests for a better balance between experiential and didactic learning,[168] as well as more supports such as workbooks are all useful suggestions to bring forward. This review has shown that an exclusively mindfulness-based module may not be the only way; mindfulness as part of a larger mental health strategy is also worth considering in future interventions.[169] Individualised integration will help to ensure that participant understanding, engagement, and thus benefits are as high as possible.

Despite the low number of eligible studies (n=4), this review is a significant contribution to the literature, with several key strengths. It focuses on health and social-care at an undergraduate level, a cohort which until now has been largely overlooked in favour of studies with qualified healthcare professionals or post-graduate level students.[130, 170, 171] While CPD is undeniably important, undergraduate education is potentially the most crucial time to develop good mental health practises amongst students, preparing them for the pressures of their degrees as well as their future careers. Findings from this review serve to affirm the hypothesis that mindfulness may have an important role to play in this regard.

Studies included in this review have all been published within the last four years (2014-2018), which is indicative of the recent emergence and growth of such research. Now more than ever, there is a need for robust systematic literature

reviews such as this one, in order to summarise and critically appraise their methods and findings.

The review's inclusion criteria were stringent - only interventions that were "*MBSR, MBCT or something based closely on these*," were included, and this in itself was a strength of the review. Many studies exist where short exercises in mindfulness are offered, or students are just given an audiotape to listen to at home.[171] However, this criterion ensured that included studies offered students an intervention that was experiential, didactic and interactive in nature; all important components of a high quality MBI.

It was interesting to note that while medical, nursing, midwifery, psychology and social-work students were represented in the results, many other healthcare courses, including pharmacy, dentistry and physiotherapy students were not. There is an opportunity to expand these findings outwards, and apply them to the design of future interventions in such courses, where up to now only limited experiences of mindfulness have been offered.[172, 173]

The review had a number of limitations; only studies available in the English language were included, which may have reduced the number of eligible papers and influenced the findings overall. The quality of included studies was mixed, and

methods of data collection in particular were unclear in three out of four of the studies.

3.6 Conclusion

This qualitative systematic review has sought to understand health and social care undergraduate students' experiences and perceptions of taking part in MBIs. Synthesis of the data has shown that students' understanding of, and engagement with, the concept of mindfulness is linked to the level of benefit obtained, from superficial goal-attainment to a deeper shift in attitude. It is evident from the synthesis that individualised integration is key, while taking potential barriers and facilitators into account. Further research is required in order to optimise the offering of MBIs to health and social care undergraduate students. The factors identified in this review should help to inform the design and implementation of future interventions.

3.6.1 Acknowledgments

We wish to acknowledge the contribution of Mr. Joe Murphy, medical librarian in Mercy University Hospital, Cork who assisted with the original search design.

Chapter 4: Students' experiences of the undergraduate pharmacy degree, and the potential role of mindfulness - a thematic analysis

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4.1 Abstract

4.1.1 Aim

The aim of this qualitative study was two-fold; to (a) determine pharmacy students' experiences of stress as part of the current pharmacy degree, and (b) explore the potential of incorporating the principles of mindfulness into course work in the undergraduate degree.

4.1.2 Methods

Undergraduate pharmacy students from the five Schools of Pharmacy (SOPs) in Ireland were invited to take part in focus groups (FGs) between February and November 2016. Recruitment occurred via emails, sent by gatekeepers within each of the pharmacy schools. FGs were audio recorded, anonymized and transcribed by the researcher (MOD). Transcripts were analysed using the Braun and Clarke method of thematic analysis, and coded in QSR International NVivo Qualitative Data Analysis Software Version 11. Ethical approval was obtained.

4.1.3 Results

Twenty pharmacy students (60% female) representing all years of study from three of the five SOPs participated across five focus groups. The five key themes that emerged were (1) so much to do, so little time; (2) the role of lecturers; (3) we're smart people, we want to do well; (4) learning by doing and (5) mindfulness as a coping tool.

4.1.4 Conclusions

The findings of this study support the hypothesis that students experience stress and would welcome mindfulness-based interventions as a management option in the degree. In particular, the emphasis that mindfulness places on experiential learning would be well received by students.

4.2 Introduction

Stress, defined as "a mismatch between demands and the perceived ability to cope with these demands," can have a negative impact on the physical health, mental health, and academic performance of healthcare students.[22, 23] Pharmacy students in particular demonstrate higher stress levels than the general population, regardless of year of study.[69, 174] Furthermore, healthcare student stress is reportedly linked to subsequent stress as a healthcare practitioner.[31] The psychological challenges and responsibilities associated with managing patients as a healthcare professional can lead to depression and burnout, negatively impacting upon personal wellbeing.[34] These findings are concerning, as high levels of stress can compromise patient safety, through poor decision-making and an increased risk of medication errors.[38] A recent study reported that 68% of 1,737 actively practicing pharmacists experienced job stress and role overload.[35] A further study showed that pharmacists were more likely than surgeons or physicians to resign from their jobs due to high stress levels. [37] The role of mindfulness to increase job satisfaction and patient safety in pharmacists or pharmacy students has not been evaluated to date.

Mindfulness, defined by Dr. Jon Kabat-Zinn as "*paying attention in a particular way, on purpose, non-judgmentally, to the present moment"* is a practice that changes how one relates to their present experience, breaking old habits of worry and rumination and cultivating an attitude of acceptance, rather than struggling to change the un-changeable in life.[175] MBSR, developed by Dr. Kabat-Zinn in 1979 to help hospital patients with chronic pain[48] has subsequently shown benefits in non-clinical populations, and has also produced promising results in educational

settings.[58] [1] Pharmacy students have not been represented in the literature to date. Hence, this study's research question was two-fold; to (a) determine pharmacy students' experiences of stress as part of the current pharmacy undergraduate degree, and (b) explore the potential of incorporating the principles of mindfulness into course work in the undergraduate degree.

4.3 Methods

FGs were conducted with undergraduate pharmacy students between February and November 2016. All five pharmacy schools in Ireland; University College Cork (UCC), Royal College of Surgeons in Ireland (RCSI), Trinity College Dublin (TCD), Queens University Belfast (QUB) and Ulster University (UU) were invited to participate. Ethical approval was initially obtained from CREC in UCC, and additional approval required for RCSI and TCD was also obtained (Appendices 12-14). The FG method was chosen as it was felt that participants would interact, and prompt thoughts and ideas in one another at a depth that may not occur in an interview setting.[85]

The method of sampling used was purposive, and aimed to recruit representatives from all year groups, male and female, with a representation of mature students. Snowball sampling, where existing study subjects recruit future subjects from among their acquaintances, was used in addition when uptake was low. Recruitment occurred through email, sent by a gatekeeper (an academic or administrative member of staff) in each of the five pharmacy schools.

A topic guide, as summarised in Table 4.1 was developed based on a review of previous literature, and discussion among the authors. The guide was refined after the first focus group in terms of the wording of questions, referring to field notes which were written immediately afterwards. However, no changes were made to the question content, so this focus group is included in the final analysis. All questions were used in each session, however discussions were also allowed to develop naturally, to facilitate emergence of unanticipated themes.

Table 4. 1 Topic guide for focus group discussions

1. What skills does the current pharmacy degree develop?
2. Do you feel that the degree course prepares you mentally for your future profession?
3. What factors affect your ability to study/perform in college?
4. What emotions do you experience around exam time/college deadlines?
5. Do you think that there is a need for mental support/training in the pharmacy degree?
6. What ways do you think such support could be delivered?
7. What do you know about mindfulness?
8. What would help/discourage you from participating in a Mindfulness module?
9. What are your views about online delivery of modules?
10. What would be the optimum length of time per class? Why?

The first two FGs were conducted by MOD and MK (both qualified pharmacists and involved in academic research). MK took notes during the FGs, and helped in the clarification of the wording of some of the questions when required. MOD conducted subsequent FGs independently, and made reflective notes immediately afterwards. FGs were conducted within the respective pharmacy school buildings, during times convenient to the students. MOD presented herself as a researcher, and did not engage in discussion about the topic guide prior to the FG, to reduce the risk of bias. Written informed consent was obtained, and demographic information, including gender, age category and year of study was collected. FGs were audio recorded using a Dictaphone (Olympus VN-741PC). MOD prompted and explored issues that came up where appropriate, allowing for the emergence of unprompted information and themes. Participants were informed that they could request copies of the transcripts of their contribution if desired. The audiotapes were anonymized and transcribed by MOD, to allow for immersion in the data, and preliminary familiarization with the findings. As per the Francis method of sampling, the final FGs presented no new themes, at which point it was agreed that data saturation had been achieved.[176]

Transcripts were analysed using the Braun and Clarke method of thematic analysis,[87] and coded in QSR International NVivo Qualitative Data Analysis Software Version 11. Initial familiarization involved several readings of the transcripts, all of which were initially coded by MOD. LS (a qualified pharmacist and a senior academic) independently coded a sample of the transcripts. Agreement between coders was high, and disagreement was resolved by discussion. Codes were named in language that remained true to the opinions and experiences of the participants. MOD then grouped the codes into initial themes, and verified them by reading the

corresponding excerpts, and the entire data set again, before naming and defining them. Agreement with LS was reached through discussion at each stage. The study is reported in accordance with the Consolidated Criteria for Reporting Qualitative Research (COREQ), details of which are available in Appendix 15.

4.4 Results

Demographics of participants are summarised in Table 4.2. Twenty pharmacy students (60% female) representing all years of study from three of the five schools of pharmacy participated across five FGs. The average number of participants per FG was 4 (ranging from 2 to 7 participants). All but one participant identified themselves as Irish, and two participants held a previous degree. 45% (9 out of 20 participants) reported experience of working in a pharmacy setting.

Table 4. 2 General demographic characteristics of pharmacy student focus groups

Participants (N=20)

Demographic Characteristics	Proportion %
Age range	
18-20 years (N=7)	35
21-23 years (N=10)	50
24+ years (N=3)	15
Irish (N=19)	95
Female (N=12)	60
Year of study	
1st year (N=4)	20
2nd year (N=5)	25
3rd year (N=3)	15
4th year (N=8)	40
Previous pharmacy experience (N=9)	45
Previous degree (N=2)	10
Children (N=1)	5

Five key themes emerged through analysis of the transcripts: (1) so much to do, so little time, (2) the role of the lecturer (3) we're smart people, we want to do well, (4) learning by doing, and (5) mindfulness as a coping tool. The themes are summarized in Figure 4.1.

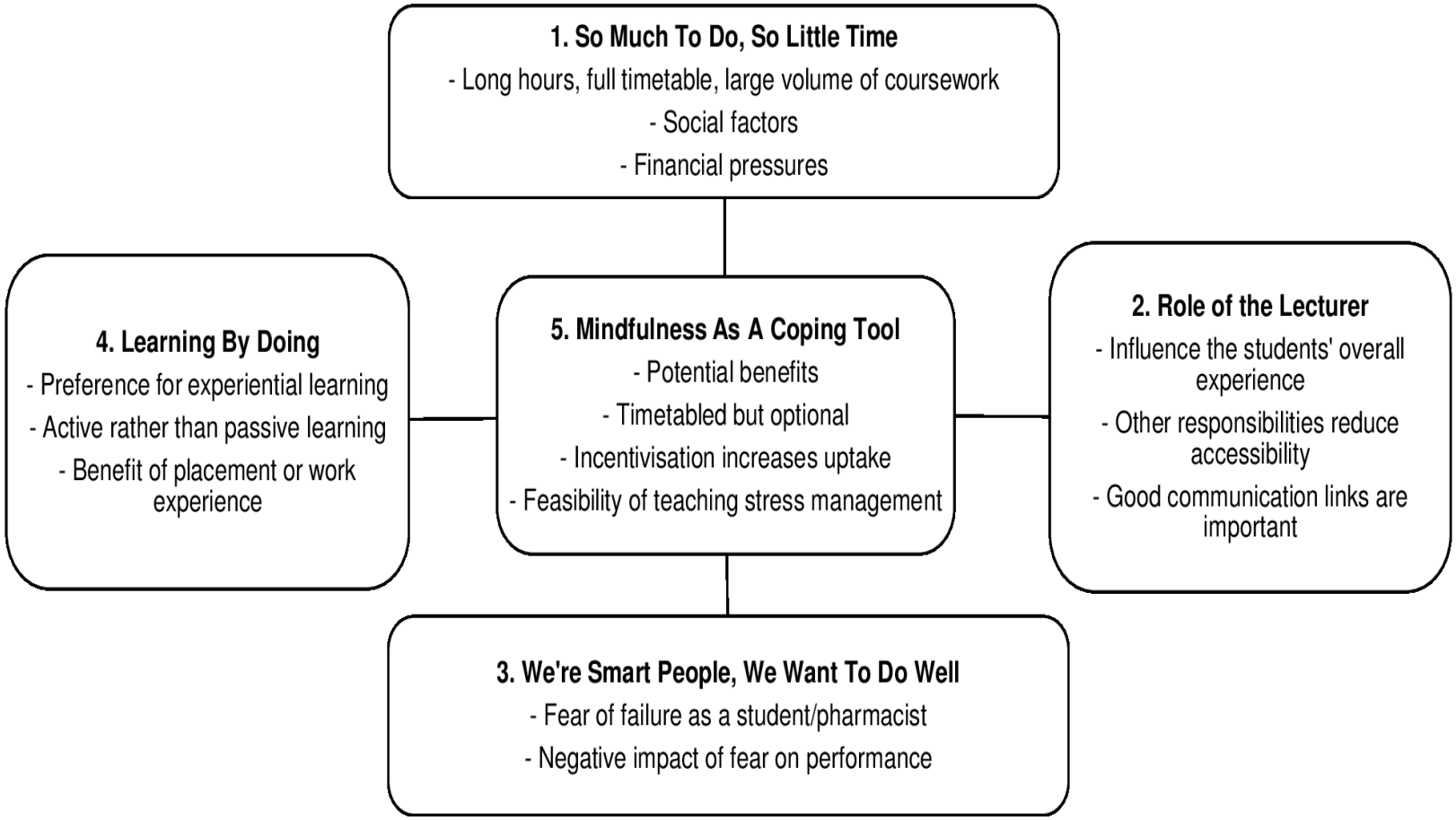

Figure 4. 1 Themes of students' experiences of the undergraduate pharmacy degree, and the role of mindfulness

4.4.1 So much to do, so little time

The feeling from participants was that their student experience is greatly influenced by the workload they need to complete within the course, with some people becoming completely overwhelmed by it all;

> *"I think definitely last year before Christmas a lot of people found it very hard. I can hear it in my voice already (emotional)…because a lot of people did find it very hard (emotional)… I know in my class alone several people were put, well got prescribed medications to cope with anxiety and stuff last year" (FG1, P4)*

> *"Many a time I used to cut down questions and predict stuff, hope it would come up…you just can't cover it all like, you can't cover everything!... you just hope to God this comes up and if it doesn't you could end up repeating another year" (FG5, P3)*

The need to multitask hinders student progress, and multiple deadlines falling at the same time increases pressure on students.

> *"It can be stressful…if you have a number of things you have to do within a short time" (FG3, P1)*

The workload of the degree leaves very little time for anything else in pharmacy students' lives, and this has a negative impact on other areas. Participants voiced concerns regarding tensions between college and weekend work, or attempts to have a social life as a student.

"Rent prices are only going up and it's more and more difficult…I'm lucky in that respect but I'm still aware that a lot of people have to pay their rent, they have to get their food so I mean a job at the weekends is pretty much the only thing…it might not be the best thing academically but financially it has to be done." (FG4, P5)

"I had to go at the weekend to work back home and I did it for ten weeks, and then I was off for a few weeks, and then I did it at Christmas time and I worked, maybe for two weeks. That cut straight into my study time and I ended up failing an exam over it" (FG5, P3)

4.4.2 The role of the lecturer

The role that lecturers play in the student experience emerged as a strong theme. The general feeling was that lecturers are quite accessible, but limited in the support that they can offer, and in some cases it was felt that they were almost just going through the motions of delivering material to students.

"I know the lecturers are very accessible. They are very good to respond to your emails and stuff like that, but I just think that the time they have they're quite limited as well you know, so they can only do so much." (FG1, P3)

"I feel like they're only just in here to teach …like I know some of them try to get so involved but then a lot of them are kind of like "oh yeah I'll just give them a lecture, I'll be gone away again like" they're uncontactable, so…I know it's trying to strike a balance between like their work, their own research work and their lecturing work" (FG1, P2)

The relationship that the student has with individual lecturers can be variable, and affect the student experience. While some students had developed good communication links with lecturers, other felt that a lack of such links hindered them from accessing the support they needed.

> *"Like we're lucky that our lecturers, they are very good to us…but sometimes they're not always there, or sometimes you're not even close to your lecturers…personally I'm not best friends with any lecturers so I don't feel like I can go to them and be like, express how I'm feeling to them." (FG5, P3)*

4.4.3 We're smart people, we want to do well

Participants articulated the fear of failure that they experience, and how it affects their performance. Primarily, fear of failure as a student – not achieving high grades, failing a year, not completing the course. Linked to this fear of failure is the constant comparison to previous personal achievements in school, and a desire not to let anybody down. Students reflected on their experience of the Leaving Certificate (the state examination for school-leavers in Ireland, and the main determinant for entry into third level education) versus their university performance to date, specifically continuous assessment and end of semester examinations.

> *"Not to get too deep or psychological about it but like to get into pharmacy you have to do so well in the Leaving Certificate…so that to come into college and to suddenly be not doing as well as you've always been doing is very tough… …so I think you get so stressed by that complete flip of how well you perceive yourself to be doing" (FG4, P5)*

"In general we are very competitive people that go into courses like this, like we're smart people we want to do well" (FG5, P3)

"I struggled to get into this course in the first place…now that I'm in it I don't want to let myself down, or I don't want to let my parents down you know……I don't want to disappoint people and I don't want to disappoint myself as well" (FG5, P1)

One participant voiced an opinion that there is a link between the critical thinking that is required in the course, and the self-criticism that students experience.

"In our course we're taught very much to be critical about what we're doing and that can definitely, like I've seen it transpire into personal life, and people becoming very critical of themselves when they didn't need to be" (FG1, P4)

Coupled with fear of failure as a student was fear of failure in the future, as a healthcare professional. Participants were very aware of the responsibilities that they will face as healthcare professionals, and the impact that their actions will have on patient health. Many vocalized a fear of handling adverse events in the future.

"Pharmacy is I think is it the second or third most sued profession? So when people kind of talk about that, kind of the idea that are we really mentally prepared to face a claim?... it's kind of a whole different degree of distress that you face when someone comes in with a subpoena or something like that" (FG3, P2)

"If you don't develop all your skills in like clinical you're going to kill someone… how do you deal with the fact that you're going to do that?... like how do you

deal with the fact that someone's life is…I know we're supposed to know that, but I don't think many of us would actually face that reality if it actually happened. Like it would ruin someone…" (FG1, P2)

Participants attributed recurrent procrastination to this fear failure, particularly in relation to study for exams.

"I think people procrastinate because they're afraid of failing…that fear of jumping in but then not actually being good enough anyway is just kind of scary" (FG4, P3)

A small sample of participants voiced a different perception of exams, considering them to be *"enjoyable"* to a certain extent – a view that was not influenced by a fear of failure, and was contrary to the common viewpoint.

"I generally like exams, I'm a really odd exception to any of these rules like!... I mean you could be stressed out depending on the exam but I mean…there's only so much material and the lecturers will examine that, and there's only certain books that they look at and they will examine those books…I'm never too stressed about them really" (FG3, P2)

4.4.4 Learning by doing

Students articulated the idea that what's taught most effectively during the degree is delivered in a hands-on, practical manner. Participants appreciated experiential learning, and gave many examples of active skill development, which they spoke of in a positive light.

"We did case studies and then they brought in patients…and that was really helpful and we kind of went through their health problems, and…through their

dosages and everything that they were on…I thought the application of that was really good. Kind of hopefully I'll be doing more of that like, as I go on." (FG5, P4)

Participants were in agreement that skills are developed incrementally throughout the course, and noticed an increase in their abilities as they progressed through the degree.

"I feel that definitely over the last four years they've kind of, every year they've stepped up on all the different skills and definitely at the stage that like, well I'm in fourth year so, being able to talk to people is a lot easier." (FG1, P4)

Linked to this theme of "learning by doing" was a view that having experience of working in a pharmacy setting, while not compulsory, was very beneficial in terms of applying what you've learned.

"When I started working in a pharmacy like, it was most things you kind of learn from dealing with customers…it's definitely preferential to work in a pharmacy like, and you kind of almost need it to some extent, to prepare you for going into community pharmacy, you know." (FG3, P1)

4.4.5 Mindfulness as a coping tool

There was a generally positive response to the suggestion of introducing a mindfulness course to pharmacy students, grounded in the view that there needs to be some sort of mental training implemented, in order to benefit future patients as well as the participants themselves. There was a lack of awareness around supports that were already available within the university setting,

"At the start of this year we were told that there were supports in the building but we hadn't been told up until then that there were." (FG1, P4)

and the support that was there was not always very accessible.

My friend, like last year my housemate was having problems and I was trying to get her help and support and it wasn't easy at all, so like having the support within the pharmacy would be great." (FG4, P4)

Participants valued the idea of having something to prevent rather than cure excessive stress.

"I think any module that would help you to you know develop your mental thinking with regards to the profession, people would be interested in it." (FG1, P3)

In general, participants had some understanding of what mindfulness is, often informed by previous experience of mindfulness in other settings;

"Being self-aware. Understanding your own emotions and thought processes, and kind of like not…letting yourself run away with your emotions" (FG1, P2)

However, some common misconceptions of mindfulness were voiced also, including the idea that mindfulness is about getting rid of all thoughts, and achieving a state of relaxation.

"yeah it was interesting enough, it was basically just kind of just complete relaxation almost, just thinking about as little as possible." (FG3, P1)

Some participants raised questions around the feasibility of "teaching" stress reduction, feeling that stress is a very individual thing, unique to each person, which

one needs to personally experience and then handle in their own way. Other stress management strategies such as yoga or sport were mentioned, however the extra-curricular nature of these activities hindered regular participation, and students voiced the opinion that no one method would suit everybody.

In terms of how to deliver mindfulness training, it was apparent from the suggestions received that a mindfulness course would have to be interactive, echoing the theme of "learning by doing". Face to face delivery was preferred, with some mixed reactions to the suggestion of an online course.

> *"I think if you're teaching mindfulness you couldn't be in lectures…there's no point in someone telling you "be mindful" you know what I mean! And I think the more workshoppy (sic) tutorial type situations that we've done over the four years have definitely been more beneficial, you definitely learn a lot more." (FG2, P1)*

It was felt that the best way to include mindfulness into the curriculum would be as part of the weekly college schedule, in an existing module – clinical pharmacy was the place where students felt it fit best.

> *"People don't want to be giving up half their lunch…unless you find gaps in people's timetables…you could just find a gap in the fourth year timetable, go with that, find a gap in second year…" (FG1, P2)*

Early introduction of such training was recommended, although there was ambivalence about whether first years would understand the need for this type of learning.

"I think maybe first years might look at it in one way in that well I might as well get the skills in now, or they might not see the necessity for it because they don't realise what's to come! So you might get second or third years saying well I'm in this now, so I may as well try and do this and see if it helps." (FG4, P5)

It was felt that only those who were stressed would take part, and that this could in itself be a barrier to participation, with people becoming conscious of how they would be perceived if they signed up.

"I don't think anybody will sign up that isn't feeling the stress or pressure, you know that's going to be their main like driving factor…yeah" (FG5, P2)

"some people might see it as that you can't cope with the stress or something like that, that you're somehow like weaker…people could make that assumption like…instead of actually being an actually useful tool to help you cope with the rest of your career" (FG1, P2)

It was conveyed that some incentive would be required for an optional course e.g. certificates or credits. Otherwise, busy schedules and a heavy workload would limit uptake.

"If you told me this year, I'm going to give you a module on awareness, I'd be kind of like, "well I don't have time to go" you know?... just because we feel so under pressure with all those other things, I can see how people would be like "waste of time" even though I'm sure it could actually be very beneficial." (FG2, P1)

The standard MBSR course was considered by participants to be too long, a shorter course that could be incorporated into the timetable could be a viable option that students would take part in.

> *"I think you could find it hard for people to go… two and a half hours is a lot of time…If you've college even from 9 to 5 or 9 to 6, and that's at seven, that means you're like not getting home until like half nine like, you know" (FG1, P4)*

4.5 Discussion

The five themes that emerged from these focus groups provide an insight into the current experience of pharmacy students within the degree, and the role that mindfulness could play in that experience. Challenges that students encounter as part of the degree, and fears that they have of future responsibilities as healthcare professionals could potentially be addressed through mindfulness training.

The preference for experiential learning that these focus groups have highlighted is encouraging, suggesting that an approach such as mindfulness would be well received by pharmacy students due to its experiential nature; it first immerses learners in an experience, and subsequently invites reflection about the experience to develop new skills, or new ways of thinking [177]. Rather than simply providing students with didactic teaching about stress and wellbeing, experiential mindfulness techniques may be useful for those who benefit from having hands-on examples to bolster their traditional learning.[178]

These focus groups have provided rich information regarding the overwhelming pressure that pharmacy students find themselves under with regards to completing a professional course. This reflects findings from previous research that pharmacy students were the most likely undergraduate group to suffer from stress.[174] Undergraduate healthcare students in general experience moderate levels of stress, with a correlation between stress and academic achievement.[179] A systematic review conducted by the authors has found benefits of mindfulness for other healthcare students, which serves as an indicator of effectiveness for this particular cohort.[1] However, the theme of being overburdened in terms of scheduled coursework cannot be overlooked, and should influence course design – how much time can pharmacy students realistically commit to weekly mindfulness classes and/or daily practice? Such a course would need to fit into an already busy schedule, and be presented as part of the curriculum to achieve buy-in, without being made compulsory.

The importance of the role of the lecturer in relation to student experience presented strongly, and this is something that the Mindfulness Based Interventions Teaching Assessment Criteria (MBI-TAC),[90] the competency guidelines for mindfulness teachers, explicitly addresses. Three of its six domains relate to the teacher's interaction with students, and their engagement with participants, namely embodiment, inquiry and holding of the group. These competencies are not necessarily highlighted as important in a traditional lecturing role, but could provide students of a mindfulness class with the support and interaction needed to enhance their student experience, cultivating a feeling of support.[180]

The “fear of failure” that participants articulated is reflective of the high academic achievers who sign up for courses such as pharmacy. Pharmacy students have been shown to be highly “achievement” orientated,[181] which can feed rumination and procrastination. Previous research has found that mindfulness is negatively correlated with rumination.[135, 182] Mindfulness training as part of the pharmacy degree could enable participants “to see more clearly the patterns of the mind, and to recognize when mood is beginning to dip without adding to the problem by falling into analysis and rumination”. [183]

Participants voiced the opinion that something incorporated into the pharmacy course could be extremely beneficial, due to the challenge of attending extra-curricular activities. While there was doubt from some participants regarding the feasibility of teaching stress reduction through mindfulness, this may be due to the misconception of mindfulness being a process of “emptying your mind”. [184] While the stress itself cannot be changed, mindfulness is a way to change one’s relationship with stress. Some participants voiced the view that “exams are enjoyable”, which illustrates how a person’s perception determines their experience, and through mindfulness, pharmacy students’ perceptions of stress may be altered in a positive way. This builds on the findings of a previous study which found that test anxiety was associated with students’ perception of course load and ability to manage time.[185]

Limitations of this study include the fact that not all pharmacy schools were represented by those who took part in the focus groups. Also, this study was undertaken in Ireland, and may not be fully representative of the experiences or views of pharmacy students in other countries. Nonetheless, it provides pharmacy

educators with valuable insight into the challenges that pharmacy students face and the reaction students may have to incorporating mindfulness into coursework.

4.6 Conclusion

This study has provided valuable insight into the perceptions of pharmacy students of the current pharmacy degree in Ireland, and provides potential benefits and challenges of incorporating mindfulness into coursework. The experiential nature of such a course would suit the active learning and engaged teaching methods that pharmacy students seem to respond to best, and the content of a mindfulness course could help to address some of the pressures of the current programme of study.

Chapter 5: Impact of a mindfulness-based intervention on undergraduate pharmacy students' stress and distress: quantitative results of a mixed-methods study.

This chapter is currently under review in *Currents in Pharmacy Teaching and Learning.*

Authors: **O'Driscoll M,** Sahm LJ, Byrne H, Lambert S, Byrne S.

Published abstract: **O'Driscoll M,** Byrne S, Lambert S, Sahm LJ. Mindfulness training for pharmacy undergraduate students in University College Cork (UCC) – quantitative results of a mixed-methods study. *Pharmacy Education*, 2018; 18 (1) 2.

5.1 Abstract

5.1.1 Background

Stress negatively impacts upon physical and mental health, and is linked to increased levels of anxiety and depression. Pharmacy students demonstrate higher levels of stress than the general population. Mindfulness may be a suitable way to improve pharmacy students' stress and distress levels, in order to cope with the pressures of the pharmacy degree and their future careers as healthcare professionals.

5.1.2 Aim(s)

The purpose of this study was to assess the quantitative effects of an MBI on pharmacy student stress, distress, burnout, empathy and mindfulness levels.

5.1.3 Methods

A quasi-randomised controlled trial was conducted at an Irish SOP during the 2016/2017 academic year. Ethical approval was granted by the Clinical Research Ethics Committee (CREC) of the Cork Teaching Hospitals. The intervention group completed a mindfulness course based on Dr. Jon Kabat-Zinn's MBSR. The waitlist control group received usual education. Participants completed a demographics form, the PSS, the GHQ, the MBI-SS and the FFMQ at baseline and immediately post-intervention. Participants also completed the JSE-HPS but this did not achieve internal validity, so the results of this were discarded.

5.1.4 Results

Full data were gathered and analysed using IBM SPSS Statistical Software Version 23 for a total of 99 students (51 intervention, 48 control).

There were no significant differences between the intervention and control groups at baseline. Post-intervention a large effect on mental distress was found (Partial Eta

Squared 0.137), with the intervention group reporting statistically significantly lower distress than the control group ($F_{(1,98)} = 15.3$, $p<0.005$) after controlling for baseline scores. Gender-specific effects of programme participation were also found; stress and distress were significantly improved for females only ($p=0.026$, $p<0.005$), while only males improved in the observing facet of mindfulness ($p=0.038$). Higher attendance rates predicted these findings ($p<0.005$).

5.1.5 Conclusion

Female pharmacy students experienced significant positive improvements in mental distress and study stress after participating in the mindfulness intervention. Mindfulness may have an important role to play in pharmacy education in the future.

5.2 Introduction

Rising stress levels and an increasing incidence of mental health problems have been identified in the university setting in recent years.[186] Stress can negatively impact upon the health and academic performance of students, especially for those involved in the study of healthcare.[22, 23, 148, 187] Pharmacy students in particular demonstrate higher levels of stress than the general population, regardless of year of study.[30, 174]

Student stress has been further linked to subsequent stress as a healthcare practitioner.[31] Managing patient burdens, and meeting the expectations of self and others have been identified as just some of the stressors encountered by healthcare professionals.[188] Pharmacists are no exception, with statistics pointing to significant stress and role overload in this cohort.[35] This can lead to a deterioration in mental health, negatively impacting upon personal wellbeing,[34] and ultimately compromising patient safety through poor decision-making and an increased medication error rate.[38] Organisations and educators are increasingly recognising the need to address the high levels of stress reported in clinical practice.[189] As a result, efforts are being made to teach and promote wellness and self-care at an undergraduate level.[190, 191]

The most widely accepted definition of mindfulness has been offered by Dr. Jon Kabat-Zinn; *"paying attention in a particular way, on purpose, non-judgmentally, to the present moment."*[175] Mindfulness is a practice that brings greater awareness to present experience, and encourages a reduction in the rumination and anxiety that negatively impacts upon a person's wellbeing.[192] MBSR is a manualised course, originally developed in 1979 to help patients dealing with chronic pain.[48] It has shown positive effects in emotional regulation, stress and anxiety reduction, and

immune system improvement.[193, 194] There is a growing amount of research that also shows its potential benefits in an educational setting [58] [1]

Interestingly, while MBSR has being condensed and used successfully in medical, nursing and psychology education, its potential benefits in pharmacy education has yet to be fully explored.[1] This research group has identified a need for self-care and wellness training in pharmacy education, and research conducted in pharmacy schools across Ireland has found that pharmacy students are open to the concept of mindfulness.[2] These findings have also informed the format of the intervention that has subsequently been designed, i.e. a condensed four-week mindfulness intervention.

The aim of this study was to assess the effect of a four-week mindfulness course on pharmacy students' stress and distress levels. This was a mixed methods study, and the quantitative results obtained are presented in this chapter.

5.3 Methods

5.3.1 Participants and recruitment

Ethical approval for this study was granted by the CREC of the Cork Teaching Hospitals (Appendix 16). Undergraduate pharmacy students who were enrolled in UCC for the 2016/2017 academic year were invited to participate in the study. Information about the study was provided during lectures by the primary researcher via a ten-minute presentation. Information leaflets and consent forms were distributed, and an enrolment session was scheduled for the following week.

Participants were required to be over 18 years of age, and were advised that they could withdraw consent at any time. Students were not screened for mental illness,

as the purpose of the programme was health promotion rather than psychotherapy. However, they were advised that should excess stress or mental strain be uncovered during attendance of the course, support would be offered by the appropriate college staff members.

Information from similar interventions with healthcare student cohorts allowed an estimate of required sample size to be made.[64] It was found that a sample size of 50 students per group, after allowing for dropout, would be needed in order to see a 20% reduction in stress and mental distress (alpha level 0.05, 80% power).

5.3.2 Procedures

All students who consented to taking part in the study were allocated alphabetically by surname to either the intervention or the control group. This quasi-randomisation method was employed to facilitate timetabling of the course, as it grouped participants according to their existing tutorial groups. Both groups completed baseline measures at time-point 1 (T1) before the course began. The intervention group completed the mindfulness course, while the waitlist control received usual education. Post-intervention, both groups completed the second questionnaire (T2), which repeated the measures of T1, as well as obtaining course feedback from intervention participants. Students in the waitlist control group were subsequently offered and delivered the mindfulness course, to satisfy ethical requirements. All participants were assigned a unique identifying number prior to analysis in order to ensure that data remained anonymous.

5.3.3 Description of the intervention

The mindfulness programme – based on Dr. Jon Kabat-Zinn's MBSR course – was incorporated into the students' class timetables, to facilitate attendance. Course development was carried out by the primary researcher, with the advice of an experienced MBSR teacher and teacher-trainer. The original MBSR programme was condensed in duration from eight weekly sessions of 2.5 hours, to four two-hour sessions. Daily practice was decreased from 45 minutes to 20 minutes, and the day of mindfulness between Week 6 and 7 was omitted. These changes were made in light of reviews of the existing literature which indicated effectiveness at shorter durations, and the feedback obtained from focus groups conducted with students during the design of the intervention, specifically in relation to inability to commit to such a long programme.[1, 2] Course content has been described in Appendix 2. Despite its condensed format, it remained in line with the key teachings of the MBSR.

5.3.4 Instructor qualifications

The primary researcher, a qualified pharmacist who attended a teacher-training course with The Mindfulness Centre for Professional Training in Ireland and practiced mindfulness for five years, delivered the course to participants. Regular teaching supervision was provided as per the Irish Good Practice Guidelines for the Teaching of Mindfulness-Based Courses[88] by a senior teacher, who had herself received training from the authors of the original MBSR course in the University of Massachusetts Centre for Mindfulness. This level of supervision ensured teaching quality and adherence to the programme.

5.3.5 Measures

An initial demographics form collected information about participant gender, age category, nationality, whether the participant had a previous degree, experience of working in a pharmacy setting, and year of study (Appendix 17).

Stress was measured using the PSS.[68] This ten-item scale asked participants to rate how often in the last month they had experienced particular feelings or thoughts, with a choice of five response categories ranging from 'never' (0) to 'always' (4). Four questions required reverse scoring, with the total score ranging from 0 (no stress) to 40.

Mood was measured using the GHQ.[70] This test consisted of 12 items, with questions relating to mental distress experienced in the last two weeks. Evaluations for each question ranged from 0 to 3, with a maximum overall score of 36. Test scores were further categorised by allocating '0' to scores of '0' or '1', and '1' to scores of '2' or '3'. Hence, category scores ranged from 0-12, with 0-3 representing little mental distress.

Burnout was measured using the MBI-SS University Form.[72] This consisted of 16 statements of university-related feelings, and participants were invited to rate how often they experienced them, ranging from never (0) to every day (6). Scoring was divided into three sub-categories; professional efficacy (0-36), exhaustion (0-30) and cynicism (0-30).

Mindfulness was measured using the FFMQ[82] This was a 39 item scale, with each item scored from 'never or very seldom true' (1) to 'very often or always true' (5). Items were divided into five individual categories or 'facets' of mindfulness.

Empathy was measured using the JSE-HPS.[76] This was a 20-item scale, consisting of statements about empathy and understanding towards patients and their situations. Participants were required to rate each statement from strongly disagree (1) to strongly agree (7). Ten items required reverse scoring, and the overall score (20-140) was used to determine participants' empathy levels.

Attendance was reported as the number of classes attended by each participant in the intervention group, from 0-4. Participants also filled out a scale scoring the mindfulness course from 1 to 5 (1 being the lowest score and 5 being the highest) under the following headings: course content, course relevance, teaching methods and course accessibility. Post intervention, they were given multiple options to explain their level of attendance or lack thereof. Students were invited to select all options that applied, and the percentage of participants who selected each option was calculated.

5.3.6 Statistical analysis

The intervention and control groups were compared at baseline by applying independent sample t-tests and chi-square tests to the continuous and categorical variables respectively. Demographics for those who completed the study and those who dropped out were also compared. A relatively high level of missing data occurred due to loss of respondents to follow-up, hence the per-protocol method of analysis was used (40% of the 168 participants who signed up did not complete the T2 measures).

Multivariate analyses of co-variance (MANCOVA) were applied to the dependent variables measured at T2 that related to overall wellbeing (stress, distress and

burnout), while including T1 scores as covariates to take the effect of baseline scores into account in the overall results. The MANCOVA was followed by analyses of covariance (ANCOVAs) to determine the specific elements that produced significant results. These tests were then repeated to examine the effect of the intervention on each of the mindfulness facets. Due to the multiplicity of testing that was carried out, a Bonferroni correction was applied to the alpha levels, giving a required p value of 0.01 or less for significance. Effect size was calculated using a Partial Eta Squared. The values used for interpreting effect size were small (0.01 or 1%), medium (0.06 or 6%), and large (0.138 or 13.8%).[195] The impact that level of attendance had on the results was explored using multiple regression methods, controlling for T1 scores. Number Needed to Treat (NNT) was calculated to determine the clinical importance of the effect found. NNT quantifies the expected number of people that need to receive an intervention rather than the control for one extra person to have an effect within a given time period.

5.4 Results

5.4.1 Study flow

Study participant flow is illustrated in Figure 1. A breakdown of potential participants versus the percentage of students that participated in the study is given in Table 5.1. As this was a feasibility study, only the results of students with full data available (n=99) were subsequently analysed. There were no reported harms or unintended effects of the intervention.

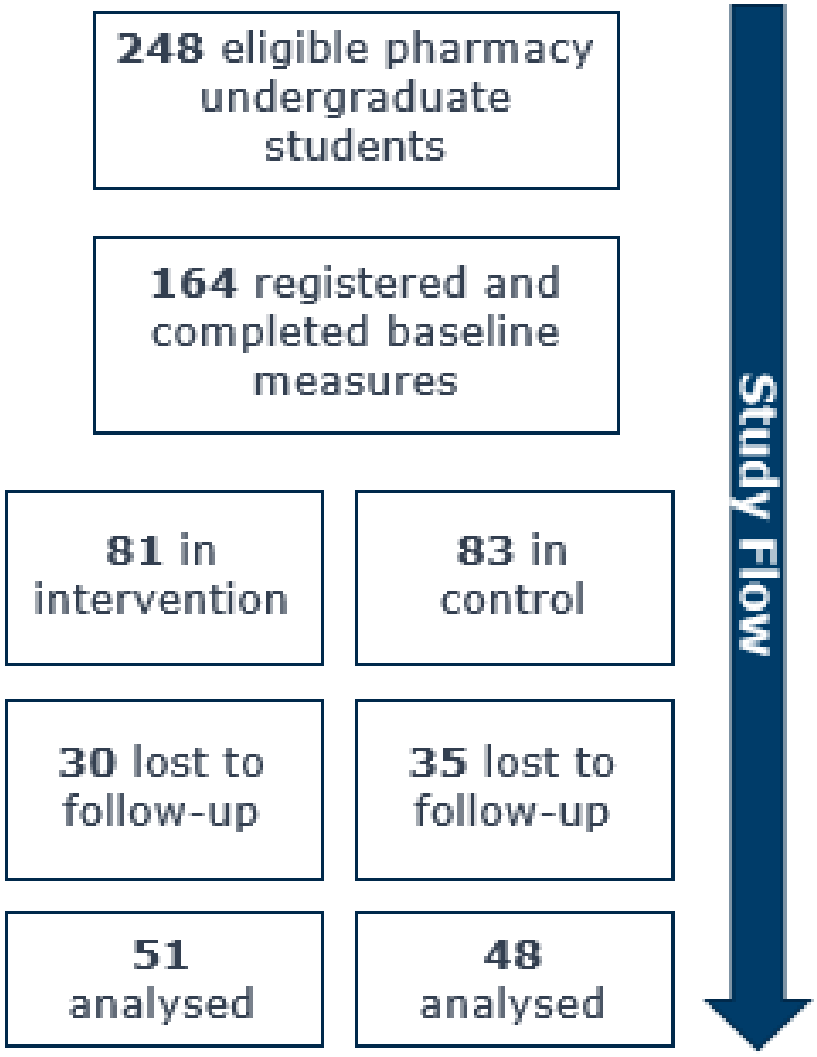

Figure 5. 1 Flowchart describing recruitment and dropout of participants.

Table 5. 1 Potential participants versus % participated

	Potential (n)	Participated (n)	%
Year 1	70	56	80
Year 2	67	10	15
Year 3	56	10	18
Year 4	55	23	42
Total	**248**	**99**	**40**

5.4.2 Internal validity

Table 5.2 presents the Cronbach alpha values which were calculated for each of the measures completed by participants. Apart from the JSE-HPS, all tools achieved acceptable Cronbach alpha values of > 0.70, indicating internal validity of their individual questions. Due to the JSE-HPS unacceptably low Cronbach alpha value (0.27), its results could not be considered accurate in this cohort, and hence were discarded.

Table 5. 2 Cronbach alpha values of the measures used

Tool	Measure	Cronbach's Alpha
PSS	Perceived Stress	0.85
GHQ	Clinical Distress	0.81
	(a) Professional Efficacy	0.78
MBI-SS	(b) Exhaustion	0.90
	(c) Cynicism	0.82
	(a) Observing	0.80
	(b) Describing	0.85
FFMQ	(c) Awareness	0.89
	(d) Non-judging	0.85
	(e) Non-reactivity	0.78
JSE-HPS	Empathy	**0.27***

*<0.70. Not internally valid, results discarded

5.4.3 Descriptive analyses

The intervention and control groups were compared for differences across the measures at T1, and no significant differences were found, either in demographics or baseline test scores. This indicated that the quasi-randomisation procedure employed had been successful, and subsequent analysis could be conducted without adjusting for any such differences. Baseline demographics are described in Table 5.3 (a).

Table 5. 3 (a) Demographics of the intervention and control groups at T1

Characteristic N (%)	Overall (N=99)	Intervention (N=51)	Control (N=48)	p-value
Female	66 (66.7)	34 (66.7)	32 (66.7)	0.135
Age (years)				0.449
18-20	62 (62.6)	33 (64.7)	29 (60.4)	
21-23	26 (26.2)	11 (21.6)	15 (30.3)	
24+	11 (11.2)	7 (13.7)	4 (8.3)	
Irish	90 (90.9)	48 (94.1)	42 (87.5)	0.309
Work Experience	54 (54.5)	28 (54.9)	26 (54.2)	1.000
Previous Degree	10 (10.1)	6 (11.7)	4 (8.3)	0.742
Year of Study				0.381
1st year	56 (56.6)	29 (56.9)	27 (56.3)	
2nd year	10 (10.1)	6 (11.8)	4 (8.3)	
3rd year	10 (10.1)	7 (13.7)	3 (6.3)	
4th year	23 (23.2)	9 (17.6)	14 (29.1)	

Table 5.3 (b) Demographics of those who completed the study versus those who dropped out.

Characteristic N (%)	Overall (N=164)	Completed (N=99)	Dropped out (N=65)	p-value
Female	109 (66.5)	66 (66.7)	43 (66.2)	0.946
Age (years)				0.172
18-20	96 (58.5)	62 (62.6)	34 (52.3)	
21-23	52 (31.7)	26 (26.2)	26 (40.0)	
24+	16 (9.8)	11 (11.2)	5 (7.6)	
Irish	148 (90.2)	90 (90.9)	58 (89.2)	0.723
Work Experience	95 (57.9)	54 (54.5)	41 (63.1)	0.279
Previous Degree	10 (6.1)	10 (10.1)	0 (0)	**0.008**
Year of Study				**0.001**
1st year	61 (37.2)	56 (56.6)	5 (7.7)	
2nd year	40 (24.4)	10 (10.1)	30 (46.2)	
3rd year	24 (14.6)	10 (10.1)	14 (21.6)	
4th year	39 (23.8)	23 (23.2)	16 (24.6)	

As shown in table 5.3 (b), when the demographics of those who completed the study were compared to those who dropped out, it was found that year of study and the numbers who held a previous degree were statistically different between the two groups (p=0.001 and 0.008 respectively).

The level of mental distress was examined and compared between intervention and control groups. The number of participants in the low distress category was 77% in the intervention group, and 79% in the control group.

5.4.4 Effects of the intervention on the main outcome measures

The MANCOVA analysis demonstrated a statistically significant result when testing the effect of the intervention on the main outcome measures (stress, distress and burnout) compared with the control group (Partial Eta Squared =0.13, $F_{1, 98}$=2.627, p=0.029). When follow-up ANCOVAs were applied to this result (Table 5.4), it was found that the intervention had a statistically significant effect on mental distress,

with those in the intervention group demonstrating a 17% decrease in GHQ scores, while control group scores increased by 19%. Stress levels increased by 12.2% in the control group but were maintained at their existing level in the intervention group, avoiding increased perceived stress later in the semester. However, this result was not deemed statistically significant.

Table 5. 4 Outcome measures at T1 and T2 for the intervention and control group

	Intervention (N=51)		**Control (N=48)**		**Partial Eta Squared**	**$F_{(1, 98)}$**	**p-value**
	T1 Mean (SD)	**T2 Mean (SD)**	**T1 Mean (SD)**	**T2 Mean (SD)**			
PSS	16.5 (6.4)	16.6 (6.3)	16.4 (5.2)	18.4 (5.4)	0.037	3.7	0.06
GHQ	11.2 (5.0)	9.3 (5.1)	10.4 (4.3)	12.4 (4.9)	0.137	15.3	**<0.005***
MBI-SS							
• ***Professional Efficacy***	24.6 (6.1)	24.8 (7.3)	24.4 (5.8)	23.3 (6.4)	0.015	1.4	0.24
• ***Exhaustion***	15.4 (7.8)	15.6 (7.8)	17.8 (6.6)	18.7 (7.0)	0.018	1.8	0.19
• ***Cynicism***	8.9 (7.3)	8.6 (7.5)	9.1 (6.5)	10.0 (7.2)	0.014	1.4	0.23

***Denotes statistically significant result**

While stress and burnout scores showed improvements, these results were not statistically significant. The number of students who scored below the GHQ cut-off score of ≥4 at T2 was 42 in the intervention, versus 35 in the control group. The NNT was calculated to be 11 (1/0.094).

5.4.5 Effect of the intervention on the mindfulness facets

A MANCOVA analysis, which used T1 scores as co-variates showed that there was no overall statistically significant effect of the intervention on FFMQ results compared to the control group (Partial Eta Squared =0.089, $F_{1, 98}$=1.712, p=0.14). This is despite there being subsequent evidence in the ANCOVA tests for statistical significance in the observing and describing facets (Table 5.5).

Table 5. 5 Outcome of five mindfulness measures at T1 and T2 for the intervention and control group.

	Intervention (n=51)		Control (n=48)		Partial Eta Squared	$F_{(1, 98)}$	P value
	T1 Mean (SD)	T2 Mean (SD)	T1 Mean (SD)	T2 Mean (SD)			
Observing	24.0 (5.7)	26.0 (6.0)	23.1 (6.4)	22.7 (6.8)	0.066	6.8	**0.01***
Describing	26.5 (5.9)	28.2 (6.9)	25.4 (5.4)	24.7 (6.8)	0.064	6.5	**0.01***
Act With Awareness	25.8 (6.6)	25.8 (6.6)	25.8 (5.8)	23.7 (6.7)	0.033	3.3	0.07
Non-Judging	25.9 (6.9)	28.0 (5.7)	25.2 (6.1)	25.9 (7.4)	0.024	2.3	0.13
Non-Reacting	19.6 (4.9)	21.5 (3.7)	20.4 (4.4)	20.3 (4.9)	0.036	3.6	0.06

***Denotes statistically significant result**

5.4.6 Effect of gender on the outcomes

At baseline, females had statistically significant higher stress (p=0.037) and reactivity (p=0.045) levels and lower cynicism (p=0.045) than males. When the results were split by gender, it was found that post intervention, stress and distress were

significantly improved for females only (p=0.026, p<0.005), while only males improved in observing scores (p=0.038). A two-way ANCOVA at T2 showed that gender significantly affected the impact of the intervention on distress scores, with females responding better to the intervention (p=0.042).

5.4.7 Effect of attendance on the outcomes

The average rate of attendance was 2.5 classes (SD 1.6), with 47% of intervention participants attending all four classes, and 70% attending at least half of the course. When multiple linear regression was conducted to assess the effect of attendance on T2 scores, while controlling for T1, it was found that attendance levels had a statistically significant positive effect on mental distress and the observing facet of mindfulness (R^2=0.191, p<0.005 and R^2=0.14, p=0.004 respectively). Higher attendance led to bigger improvements in these scores.

5.4.8 Course Feedback

The percentage of participants (n=51) who rated the course either a 4 or 5 out of a maximum score of 5 on the provided scale was high for all categories; course content (81.9%), course relevance (82%), teaching methods (90.3%) and course accessibility (81.1%). Participants' reasons for signing up to the course, and for their high or low attendance rates were explored via a multiple choice feedback form (Appendix 22). The most frequently chosen reasons are presented in Table 5.6.

Table 5. 6 Attendance feedback form – top three answers to each question.

Question	Reason	%
Why did you sign up to this course?	Sounded beneficial	90.2
	Wanted to take part in the research	70
	Curious about what the course involved	55
Signed up, but did not attend any classes	College assignments	77.4
	Study for exams	77.4
	Personal engagements/commitments	41.5
Attended one or two classes (less than 50%)	Busy with assignments	76.7
	Study for exams	50
	Personal engagements/commitments	43.3
Attended three or four classes (over 50%)	Class atmosphere	67.7
	Teaching methods	67.7
	Taking time for myself	67.7

5.5 Discussion

The results generated from this study indicate that the four-week mindfulness course reduced mental distress in the intervention group compared to the waitlist control. This is in line with similar studies which have also achieved improvements in distress levels,[51, 130] and is a promising finding for pharmacy education.

The overall difference in stress between the two groups in this study were not statistically significant, although they did trend in a positive direction. This is in contrast to previous studies which have succeeded in achieving significant benefits in stress levels post intervention.[51, 134, 137] Factors such as failure to complete daily practice, and perhaps an over-condensing of the course could be reasons for the lack of statistical significance of this study's results.

When analysed separately, only female students showed a statistically significant difference in their stress levels compared to males. Considering the initial baseline difference in scores between the genders, it was interesting to note that the intervention succeeded in bringing female scores back in line with their male counterparts. This confirms the findings of de Vibe et al 2013, who found the same effect of gender on participant scores.[65]

Burnout scores did not change significantly post-intervention. Burnout has been significantly altered by MBIs in other cohorts in the past,[196, 197] and although the results of this study were not significant, they did trend in a positive direction. Further development of the intervention may be useful to enhance its effect on burnout levels, improving general wellbeing.

With regards to the mindfulness facets, this study noted increased observation and description scores only. The measurement of "mindfulness" is itself continually debated,[198] and this uncertainty may be further illustrated by the variance of results that similar studies utilising the FFMQ have reported.[51, 134, 137] Also, it is feasible that a short course may be successful in increasing participants' observation and

description scores, with the remaining more complex facets of awareness, non-judging and non-reacting requiring more time to develop than four weeks.

Attendance levels were instrumental in improving test scores, with higher attendance increasing the effect of the intervention, particularly for mental distress and observation abilities. It is a finding across interventions of this kind that attendance proves to be a real challenge for participants.[163] Although the study design was specifically adapted to overcome this obstacle by incorporating the course into existing timetables, the 40% attrition rate combined with the course feedback received of being too busy with college assignments and study for exams illustrates the fact that timetabling is not enough. More needs to be done to incorporate self-care into the ethos of pharmacy education. It was interesting to note that first years were more diligent in completing the study, suggesting that they would be the best year to target in future implementation of such education. Also, none of the students with a previous degree who signed up to the study dropped out of it, perhaps reflecting their understanding of the importance of this type of learning.

While short samples of mindfulness have been offered to pharmacy students and qualified pharmacists in very recent times,[199, 200] this is the first known study of its kind to assess the effect of MBSR-based mindfulness training on pharmacy students. It was interesting to note that the results generated similar findings to other undergraduate healthcare students, specifically decreases in mental distress, and the difference between genders in stress scores[64, 119, 201].

While these results are promising, they need to be interpreted with caution as this was a relatively small-scale study, conducted in one university. The four-week course was designed specifically for this intervention, and was being delivered for the first time. Although its content was based on MBSR, it was condensed down in terms of duration, and although searches of the literature had shown that shorter versions of the MBSR can also be effective[1], this may have reduced the significance of the findings. Similarly, while daily home practice was "prescribed" as part of the course, participants self-reported not engaging with this.

Another limitation of this study, one which has also been reported by similar studies in the past[64], is a potential self-selection bias. 40% of eligible students chose to take part in the study and provided full data for analysis. It is possible that these students are the ones that were most motivated and/or in need of such a course. This needs to be borne in mind when interpreting the results.

5.6 Conclusion

In conclusion, this study has shown that offering pharmacy students mindfulness training as part of their degree can decrease mental distress, with the potential to also improve stress, burnout and mindfulness levels. The findings have also expanded on existing knowledge of the impact of gender on such results. Later work shall explore qualitative data generated from participants, to understand the full effect and potential of such training. Mindfulness may have a future place as part of the pharmacy degree, to promote self-care and wellbeing as students and future healthcare professionals.

5.6.1 Acknowledgements

The authors wish to thank the staff and students of the School of Pharmacy, University College Cork for their co-operation and participation in the research.

We also wish to acknowledge Dr. Kathleen O'Sullivan for her initial guidance in statistical methods, and Dr. Catriona Bradley of the IIoP for her guidance in relation to recruitment strategies.

Chapter 6: Undergraduate pharmacy students' experiences of a mindfulness-based intervention: qualitative results of a mixed-methods study.

This chapter is currently under review in *Currents in Pharmacy Teaching and Learning.*

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6.1 Abstract

6.1.1 Background

Stress negatively impacts upon physical and mental health, with pharmacy students demonstrating higher levels of stress than the general population. Mindfulness may be a suitable way to improve pharmacy students' stress and distress levels, in order to cope with academic pressures and professional responsibilities. It is hypothesised that qualitative data will provide an in-depth insight into participants' experiences of the mindfulness course.

6.1.2 Aim(s)

The aims of this study were to qualitatively assess the effects of a four-week mindfulness course on pharmacy student stress and wellbeing, and to obtain students' views and insights into course content and design.

6.1.3 Methods

Undergraduate pharmacy students in UCC who had completed at least 75% of a four-week mindfulness course offered during the 2016/2017 academic year were invited to participate in follow-up interviews. Local ethical approval was obtained. Recruitment occurred via email. Interviews were audio recorded, anonymized and transcribed by the primary researcher. Transcripts were analysed using thematic analysis guided by Braun and Clarke,[87] and coded using QSR International NVivo Qualitative Data Analysis Software Version 11.

6.1.4 Results

A total of 21 participants (62% female) representing all year groups were interviewed in March 2017. Thematic analysis generated the following three key themes regarding the mindfulness course: (a) pre-course expectations, (b) course

experience, and (c) post-course reflections. Subthemes included; the group dynamic, the non-academic nature of the course, and the challenges of future implementation.

6.1.5 Conclusion

Participants reported benefits in their ability to manage stress as a result of taking part in the mindfulness course, although they acknowledged that mindfulness is not necessarily for everybody. The results of this study will be instrumental in deciding how best to bring this research forward. Mindfulness may have an important role to play in pharmacy education in the future.

6.2 Introduction

Stress is a physiological response which occurs when one feels unable to cope with the demands placed upon them by themselves or others. While certain amounts of stress required for day-to-day living, chronic levels can have detrimental effects on physical and mental health, which has been well documented amongst our healthcare students.[22, 23] Pharmacy students have been shown to experience higher stress levels than the general population, regardless of year of study.[30, 174] Furthermore, student stress has been linked to subsequent stress as a healthcare practitioner, and in particular as a practicing pharmacist.[31,35] Mental health and personal wellbeing of healthcare professionals can be adversely affected,[34] ultimately leading to compromised patient care.[38]

Mindfulness, defined by Dr. Jon Kabat-Zinn as *"paying attention in a particular way, on purpose, non-judgmentally, to the present moment"* is a practice that changes how one relates to present experiences, breaking old habits of worry and rumination and cultivating an attitude of acceptance[175.] MBSR is the most commonly cited MBI. It consists of eight 2.5 hour sessions, 45 minutes of daily practice, and a day of mindfulness between Week 6 and 7. Originally developed in 1979 to help patients with chronic pain,[48] it has since shown benefits in clinical and non-clinical settings, with promising results as an educational tool.[58 1]

This research group preceded this intervention with a review of the available literature, to determine the effects of mindfulness to date in health and social care undergraduate students. It was found that MBSR was being condensed and used successfully in medical, nursing and psychology education, but the potential benefits

of MBIs had not yet been explored for pharmacy students[1]. Focus groups were conducted with pharmacy students across Ireland, and these highlighted a need for self-care and wellness training; crucially, it was determined that pharmacy students were open to the idea of mindfulness being introduced[2]. The potential format of such a course was also discussed at length, and these discussions, combined with information derived from the literature reviews, informed the final study design i.e. a condensed four-week mindfulness intervention.

The aims of this study were twofold; to assess the effect of a four-week mindfulness course on pharmacy students' stress and wellbeing, and to determine students' views of the mindfulness course content and design. This was a mixed-methods study and the qualitative results from participants' semi-structured interviews are presented in this chapter.

6.3 Methods

Ethical approval was obtained for this study from the CREC of the Cork Teaching Hospitals (Appendix 16). Undergraduate pharmacy students enrolled in UCC for the 2016/2017 academic year were offered the opportunity to attend a four-week mindfulness course. Students were informed about the course via a ten-minute introductory presentation given by the primary researcher at the start of the semester, and were invited to attend a subsequent enrolment session if interested in participating.

Students who attended at least 75% of the course were subsequently invited via email to take part in follow-up semi-structured interviews held in a convenient location within the School of Pharmacy, at a time that suited the participants. The

interview method was chosen, as it was determined that students would be more likely to voice their own opinions and freely discuss their personal experiences in a one-to-one setting.[86] Students who replied to the invitation email were sent a copy of the information leaflet and consent form, to be completed prior to commencement of their interview.

6.3.1 Description of the intervention

The content of the mindfulness intervention is described in detail in Appendix 2. It was designed by the authors, combining their personal knowledge in mindfulness-based interventions and pharmacy education with findings from their literature reviews and student focus groups. It was incorporated into the students' class timetables to facilitate attendance, and consisted of four weekly two-hour sessions, with 20-30 minutes of daily home practice. It remained aligned to the intentions of the original MBSR programme, albeit in a much condensed format.

6.3.2 Instructor qualifications

The course facilitator and primary researcher (a qualified pharmacist), received training from The Mindfulness Centre for Professional Training in Ireland,[202] and practised mindfulness for five years prior to initiating the intervention. Teaching supervision was provided by an experienced mindfulness teacher who was trained by senior staff from the University of Massachusetts Centre for Mindfulness, including the authors of the original MBSR curriculum. Supervision was provided at regular intervals during course delivery, as per the Irish Good Practice Guidelines for the Teaching of Mindfulness-Based Courses[88]. The purpose of this supervision was to ensure teaching quality and adherence to the programme.

6.3.3 Interview Procedures

A total of 40 students who were eligible to take part in the interviews received emails inviting them to take part in semi-structure interviews about their experience of the mindfulness course. Emails were sent out in March 2017. The first 18 participants to reply were interviewed, and as per the Francis method of sampling, three subsequent interviews were conducted to ensure that no new themes emerged.[176] A topic guide, as summarized in Table 6.1 was developed based on a review of previously published literature, and discussion amongst the authors.

Table 6. 1 Participant interview topic guide

No.	Question
1.	Tell me about how you decided to sign up for the course? What did you hope to get from it?
2.	What did you notice about this course compared to other workshops you've completed as part of the pharmacy degree?
3.	What did you like or enjoy most about this course?
4.	What did you dislike or enjoy the least about this course?
5.	What were the challenges of taking part in this course?
6.	Can you describe the role that the group dynamic played as part of the learning in the course, and how you felt you fitted into that group?
7.	How did the teaching methods used compare to other courses you've completed, and how did you feel they contributed to the learning?
8.	What was your opinion of class length, course length, timetabling of the course?
9.	What did you feel you learned during this course? Is there anything that you learned that you have brought forward into daily life?
10.	Did you feel that the course content was relevant to the pharmacy degree – why or why not?
11.	If this sort of training was to be incorporated into the degree going forward, what advice would you give regarding its integration? Or if you feel it shouldn't be incorporated, why not?

Interviews were conducted by the course facilitator and primary researcher due to her knowledge of the course content and familiarity with specific events referred to by students that had unfolded during the mindfulness classes. Written informed consent was obtained, and interviews were audio recorded using a Dictaphone (Olympus VN-741PC). Questioning was led using the topic guide that had been developed. Any unanticipated themes were also incorporated by iterative adjustment of the topic guide, facilitated by field notes made immediately after each of the interviews. All adjustments were minor, so no interviews were excluded as a result. Participants were informed that they could request copies of their transcripts if desired.

6.3.4 Analysis

The audiotapes were anonymized and transcribed by the primary researcher, to allow for immersion in the data and preliminary familiarisation with the findings. Analysis was guided by Braun and Clarke Thematic Analysis.[87] This inductive approach was deemed to be the most appropriate method, as it allowed for themes to emerge naturally, as opposed to forcing data into specific categories. Analysis involved several initial readings of the transcripts by two researchers (MOD and LS), who then independently coded all transcripts using NVivo Version 11. Any disagreements were resolved by discussion. Codes were grouped into initial themes, which were verified by reading the corresponding excerpts, and the entire data set again, before naming and defining them (MOD). Agreement at each stage was reached with a second researcher (LS) through discussion. The study is reported in accordance with COREQ,[203] provided in Appendix 18.

6.5 Results

Of the 21 interviews conducted, 62% participants were female, and all years of study were represented. A total of 285 minutes of data were recorded, with interview length ranging from 9.5 minutes to 25.3 minutes, and a mean of 16.2 minutes.

The key themes and subthemes that emerged during analysis are summarised in Figure 6.1, and explored in more detail below.

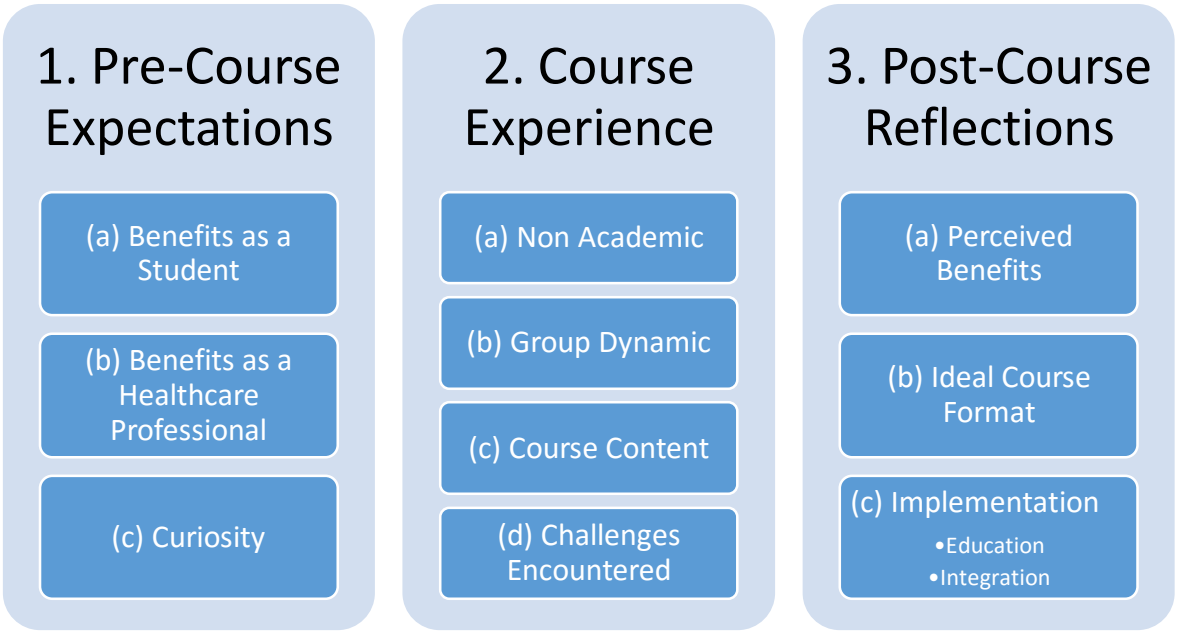

Figure 6.1 Themes and subthemes from student interviews

6.5.1 Pre-course expectations

The most often-cited reason for students to sign up for the mindfulness course was the hope of benefit for their personal, academic and/or professional wellbeing and performance. Some students anticipated that the course would provide them with a means to combat stress that they were currently experiencing, or anticipated around exam time:

"I felt that I was very, very, very overwhelmed and busy and I needed a change of some sort, so I wanted to try this out" (Participant 2, Year 3)

Others voiced a desire to "future-proof" themselves against stress in their chosen careers

"I'd love to be the kind of pharmacist like that takes it in their stride and kind of responds well to stresses in their job… I work with a pharmacist at home like, and she's brilliant pharmacist but she gets kind of drained by the job a bit like, she's very invested…. I'd like to be able to prevent that if I could." (Participant 18, Year 3)

There was also a selection of students who did not consider themselves to be currently stressed or struggling, but instead expressed a curiosity about what the course entailed, and were open to any/all benefits that participation may provide.

"I was just a bit curious. Like I didn't really have like oh yeah I'm really struggling with stress, it was just like oh yeah it'd be nice to sort of like see what it's about, learn something new." (Participant 20, Year 2)

6.5.2 Course experience

Feedback from all participants was that the mindfulness course was *"just completely different" (Participant 13, Year 2)* from anything they had ever experienced as part of the pharmacy degree. It was an interactive, informal way of learning, with the focus being on self-care rather than patient care. The non-academic nature of the course was thought to be refreshing, different, yet relevant for the most part.

"I liked the fact that it wasn't academic… everything else we do is focussed entirely on academics, whereas this was… more about you and your

wellbeing… it was nice that this was two hours that I can think about me, and just think about things that can help with me." (Participant 16, Year 1)

Pressure to retain and regurgitate information was removed, which gave space for students to focus on themselves, and how they were feeling at that particular time.

"It was nice to go into a learning atmosphere and not be worried about the assessment at the end of it, but purely for the learning side of it… it wasn't like you had to get a certain amount of points out of it… so I enjoyed that sense of relaxing but still gaining from something." (Participant 15, Year 3)

Students spoke highly of the group dynamic, and the important role that it played within the course. It was felt that the course created a safe space to learn and share experiences.

"I definitely felt like I felt I could say what I wanted to say, and it wouldn't be broadcasted outside the class." (Participant 1, Year 4)

It was also an environment where students felt recognised as individuals, rather than just numbers in a lecture hall.

"I think it was just on a more humane level. We weren't a number, we were human beings, and I think that was very important. You felt like an individual in there… I kind of felt it gave people a name to a certain extent." (Participant 14, Year 1)

They also saw this time as a unique opportunity to get to know classmates in a different way.

"I think relationships developed with people over that four weeks that could nearly take a year… because people could let their guard down to a certain extent… even if you don't talk to them on a daily basis, there's a mutual respect there that you shared something over those few weeks." (Participant 14, Year 1)

The interactivity of the course facilitated students' learning from their own experience, as well as the experiences of others, which in particular highlighted the important truth that stress is universal, and is experienced by everybody.

"We did that whole exercise on how you deal with stress… as a nineteen-year-old, I would look at mature students and be like oh they've their lives in order… and (one of them) was like "sometimes when I get stressed I cry"… They are essentially completely the same as us!... Despite the fact that we're maybe a different age and different maturity level, we still all handle stress the same way! (Participant 17, Year 2)

Students enjoyed the course content, and the variety of delivery methods used. The experiential nature of the course was appreciated, and aided their understanding of the key concepts taught. They also enjoyed the level of group interaction that was inherent in the course, and the inquiries after each activity that allowed them to come to their own learning.

"I found it beneficial that you sort of asked us first, and then we'd all sort of say what was on our mind… then like after that you'd sort of like go into it a bit deeper than we would, and then like you'd understand why you'd feel the

way you did when you gave your answer… it was a good method." (Participant 20, Year 2)

A structured progression in terms of what was taught and how it applied to daily life was recognised by most participants, although some mentioned specific exercises e.g. body scan, where they struggled to see the relevance.

"Sometimes some of the actual exercises… they were dragged out…and sometimes I felt they were kind of pointless." (Participant 11, Year 1)

None of the participants had logged in to complete the online homework more than a couple of times.

"It was just that kind of I saw it as my two hour a week thing, and then kind of forgot about it for the week. I know I probably should have been more diligent! (laughs)" (Participant 7, Year 4)

When asked if making the online format more accessible via an app would have helped, there was a mixed response.

"Yeah definitely, because once you have it downloaded you're seeing it on your screen every day and it might just remind you to do it, because you'd be just flicking through your phone and you'd see it and you'd be like oh yeah there it is, I might go for it now!" (Participant 9, Year 4)

"I don't think there's a need. Maybe…. I don't know would people…. would it change it anyway…if they're really going to do it or not?" (Participant 3, Year 1)

Delivery of the course by a pharmacist was deemed helpful by many, but not necessarily essential.

> *"yeah that was definitely helpful…it was just nice to have someone who was like I get it, it's stressful. This is why we're going to have a go at some of these kind of things." (Participant 16, Year 1)*

Participants spoke about some of the challenges that they faced in taking part in the course. Many expressed a difficulty in being able to switch from the typical academic style of learning to this interactive and experiential one. They experienced frustration at the busyness of their minds; the pull of study, exams and assignments.

> *"it was hard to just relax into it, and my focus could very quickly go to something pharmacy related or something that was bothering me in life… but kind of as the course progressed I was able to keep my mind in it a bit more." (Participant 10, Year 2)*

Despite the timetabling of the course, participants were also conscious that others in their class were using the time to go to the library, so making the decision to set the time aside and turn up was difficult for some.

> *"There was some times…where I had maybe an exam later on that day or the next day and I was very stressed coming in, and I could feel sometimes that like oh no this is cutting into my study time…" (Participant 10, Year 2)*

6.5.3 Post-course reflections

The mindfulness course was considered by most participants to have been beneficial. Some students spoke about how the course has completely changed how they relate to stress in daily life. Through attendance of the course, they became familiar with their negative stress patterns and tendencies, and gained an ability to take a step back when required, responding rather than reacting to the stress.

> *"It really did teach me to be aware that I am stressed, its stressful… it's not the end of the world though. I can stay calm about this, it's not going to destroy my life… It puts your stress in perspective, which is something that I needed." (Participant 16, Year 1)*

Others felt that the course was too short, or happened too long ago to have long-term significant benefits, but spoke about particular aspects of the course that they had brought forward into daily life, such as awareness of the present moment rather dwelling in the past or worrying about the future.

> *"I try…if I remember to do it, to have something during the day… even when I'm walking to college and stuff … I do notice things more now." (Participant 6, Year 4)*

Most participants voiced the opinion that mindfulness is not for everybody, and any future use of it should remain optional.

> *"I'd say it should be a part of the course, but at the same time it's not for everyone…like people shouldn't be pushed to doing it, but it should definitely be an option for anyone who wanted to volunteer… because you know if*

people are OK and you know dealing well with the course, it probably could be a waste of time for them." (Participant 1, Year 4)

All participants felt that the timetabling of the course was imperative to making it possible to attend.

"I thought this is just ideal because it's in the college timetable… it was so nice that it was kind of… those hours were just there. It almost seemed like it would be a waste not to do it." (Participant 13, Year 3)

It was almost unanimously agreed that "prevention is better than cure," and that if the course was to become a permanent part of the pharmacy degree it should be introduced early in first year to equip those interested with the ability to identify and deal with stress adequately.

"I could have definitely benefitted from it in first year I think…em I found the transition in first year very difficult… I think to actually sit down with some classmates in first year and all get on the one level I think it would have been nice." (Participant 19, Year 3)

An optional refresher in subsequent years would also be welcomed.

"If they do keep it up going forward… a reviser period because…the more you kind of drill it into someone, the more they might actually be likely to practise it again." (Participant 12, Year 3)

The course length of four weeks could be extended going forward, as those who found it beneficial would have no problem attending for more than four weeks.

"I definitely would be interested in doing it for longer you know, if the option was there, if I was doing it again. If it was twelve weeks, I'd do it." (Participant 19, Year 3)

Future implementation of the course was anticipated to be a challenge, which could potentially be addressed in two main ways:

6.5.3.1 Education regarding mindfulness

Participants spoke about the mixed views of their classmates regarding what mindfulness was, and the benefits that it could have. While some were not bothered by the potentially negative opinions of their peers;

"I feel like everybody I was talking to had at least one point in time where they were thinking like oh that would be good (to take part in) … so no, I never worried about them at all." (Participant 18, Year 3)

Others were concerned that they would be perceived as "not coping" for signing up to something like this.

"I'm just wondering what people thought about us, you know… I mean…people might think that OK this bunch of people are stressed and so that's why they sign up for it, you know?" (Participant 5, Year 4)

Although participants themselves saw the benefits of taking part, several spoke about the need to address misconceptions around what mindfulness is, and to disseminate the emerging science behind its benefits.

"My friend she's a doctor… and she was like there's actually so much evidence for this… I suppose we're all kind of scientific-y type people in this course, that

like if people were shown the evidence for it in a scientific manner they might buy into it a little bit more." (Participant 13, Year 3)

6.5.3.2 Integration

Students felt that going forward, education of this type would need to be a school or faculty-wide approach, rather than just the efforts of one individual researcher. It was felt that staff throughout the school would need to actively encourage and normalise participation to achieve student buy-in.

"I think if it was a very proactive, kind of like a whole school approach, it would be more normal… I think more people would be inclined to do it." (Participant 11, Year 1)

Promotion of this type of learning at a school level would help students to feel that participation was not viewed as an admission of weakness, but rather as a positive step towards continuing professional and personal development.

"If (the staff) are encouraging it, it makes you feel like it's a good thing to do. And I think definitely if some of the staff came on board with it and they enforced it and kind of said look this is going on, it's there for ye." (Participant 19, Year 3)

6.6 Discussion

The themes generated by these interviews provide an important insight into the effect of this four-week mindfulness course on pharmacy student stress and wellbeing. The results have also created an opportunity to understand students' experience of participation in the course, and to highlight potential challenges in future course development and implementation.

In UCC, where this study was conducted, there has been a 10-15% yearly increase in the numbers of students availing of counselling services, with 1,351 students seeking help in 2016/2017.[204] Participants in this study reported that they took part with the hope that they could develop a skillset to manage such stress, and/or to be able to cope with stressful responsibilities as healthcare professionals in the future. This level of reported current stress among participants confirms what had been discussed in previous focus groups, conducted pre course design[2] and is not unique to pharmacy education in Ireland,[30, 174] MBIs have historically proven to be effective for undergraduate healthcare students,[51, 64, 127] and participants in this study hoped that they would experience similar benefits.

All interview participants reported that the course was effective for reducing stress and increasing self-awareness to some degree, although the level of effect that participants reported varied from "life-changing" shifts in their relationship with stress, to less dramatic "extra moments of awareness." These findings are congruent with those of other studies which implemented MBIs in a variety of settings.[205-207] Importantly, it has been shown that even a slight reported increase in self-awareness,

and an ability to adopt a mindful approach can protect against future anxiety and depression.[208]

Students' feedback on their course experience was positive overall, with many aspects that resonated with them. In particular, the importance of the group dynamic, and the atmosphere created within the group setting that promoted experienced social support was highly regarded. This has also previously been reported as a positive outcome in other MBSR studies,[52] along with the potential benefit of a positive relationship with the facilitator.[180, 209] Students also enjoyed the interactive, experiential style of learning that was inherent in the course; something that was anticipated by the focus groups held during course design[2].

An interesting point raised by many participants was the issue of course length. As previously discussed, MBSR is an eight-week course, [48] but a review of the literature and feedback from focus groups advised a reduction of this.[1, 2] It was surprising therefore that many participants in this study would actually have liked the course to be longer e.g. 6-8 weeks. There are studies that have delivered longer interventions, but potentially at the expense of participant numbers in some cases.[114, 137] Feedback from a similar study with social care students was that a six-week course was too long to commit to.[162] Future delivery of such courses should look at balancing duration with effect.

The small sample size of this study is in line with the relatively small numbers of students who take part in such interventions, and the often high drop-out rates reported.[1] However, useful ideas were obtained for strategies that could maximise student buy-in (e.g. education around the scientific evidence-base for MBIs[210]) in

order to combat negative perceptions, and facilitate the successful integration of mindfulness for those that would benefit the most. This reflects the findings of Sears et al, who emphasises the importance of addressing issues in attendance and practice in order to reduce attrition rates.[211] Furthermore, participants' views around the importance of whole-school promotion of self-care have been raised in previous articles, which highlight the impact of legitimising self-care and normalising vulnerabilities in an often perfectionistic environment.[65] This concept is further reflected in the recommendations of the Mindful Nation UK Report, which advocated for the restructuring of finances to accommodate such education initiatives.[150]

Nonetheless, participants were cognisant of the fact that not everybody would need or want such a course, with the phrase "mindfulness is not for everybody" recurring frequently. This is reflective of similar findings in comparable studies, which concluded that the role of mindfulness may serve better as part of a broader self-care component, or with alternative approaches offered instead.[161, 162] This is worth exploring in future research – what role can mindfulness play as part of a larger educational package?

A key limitation of this study is that participants in the semi-structured interviews were those who attended at least 75% of the course, and therefore were possibly more favourable of the concept of mindfulness, skewing the data towards a positive outcome. Hence, our findings are not generalizable to all pharmacy students. Future research would attempt to interview those who did not achieve such high attendance rates, or did not take part in the course at all, in order to balance the findings.

6.7 Conclusion

In conclusion, this study has qualitatively investigated the effects of a four-week mindfulness course on pharmacy students' stress and wellbeing, gaining valuable insights into their views about course content and future implementation. While limited in generalisability due to the small self-selecting sample, it has captured in rich detail the range of participant experiences, perceptions and reflections, where quantitative results are less illustrative. Findings indicate that pharmacy students experience stress currently, and anticipate stress as future healthcare professionals. The intervention was deemed by participants to be a potentially suitable means of teaching self-care, with suggestions for improved acceptability and accessibility. These important insights can be drawn on by pharmacy educators in the development of future wellness education initiatives within the pharmacy curriculum.

6.7.1 Acknowledgements

The authors wish to thank the staff and students of the School of Pharmacy, University College Cork for their co-operation and participation in this research.

Chapter 7: An online mindfulness-based intervention for undergraduate pharmacy students: results of a mixed-methods study.

This chapter is currently under review in *Currents in Pharmacy Teaching and Learning.*

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7.1 Abstract

7.1.1 Background

Stress has a negative impact upon pharmacy students' physical and mental health. Face-to-face mindfulness courses have been shown to decrease student stress, distress, and burnout and increase mindfulness levels. There is growing interest in the online delivery of mindfulness training, particularly due to its potential ability to overcome logistical issues.

7.1.2 Aim(s)

The purpose of this study was to assess the effects of an online MBI for pharmacy students through quantitative and qualitative methods.

7.1.3 Methods

A quasi-randomised controlled trial was conducted at four SOPs on the island of Ireland during the 2016/2017 academic year. The intervention group took part in a four-week online mindfulness course, based on Dr. Jon Kabat-Zinn's MBSR. The waitlist control group received education as usual, with delayed access to the online module. Participants completed a demographics form, the PSS, the GHQ, the JSE-HPS, the MBI-SS and the FFMQ at baseline and post-intervention. The results generated were analysed using IBM SPSS® Statistics Software Version 23.0. The answers provided to free-text questions about the experience of participating in the course were collected in Microsoft Excel® and analysed using thematic analysis.

7.1.4 Results

Of those who participated (n=52, 76.9% female), no significant differences were found between the intervention and control groups at baseline. Post-intervention, a statistically significant difference in professional efficacy was found between the groups, with the intervention group scoring higher than the control group (p=0.004). There was also a statistically significant difference in observing scores (p=0.003). Gender-specific effects of programme participation were evident; males responded better to the intervention in relation to stress levels (p=0.04) and non-judgement (p=0.03). However, only females demonstrated significant improvement in professional efficacy (p=0.002). Participants reported stress reduction and increased awareness of thoughts and emotions as a result of taking part in the course, however they found it challenging to set the time aside to complete it, and reported some technical issues with the online format.

7.1.5 Conclusion

The combination of quantitative and qualitative results provides valuable insights into the feasibility and acceptability of an online mindfulness course for pharmacy students. The benefits in stress reported by students indicated that there could be a role for this format, once technical improvements are made. It is hoped that the findings of this study will inform the design and implementation of larger studies in the future, enhancing their likelihood of success.

7.2 Introduction

Stress in the university setting has been well documented,[212, 213] and has been shown to negatively impact upon the health and academic performance of students, in particular those involved in the study of healthcare.[22, 23, 148] Pharmacy students have higher stress levels than the general population, regardless of year of study.[69, 174] This has subsequently been linked to stress as a healthcare practitioner,[31] with negative consequences including reduced empathy for patients,[214] poor decision-making, an increased medication error rate,[38] and a deterioration in personal mental health.[34,32]

Academic interest in the area of mindfulness has grown exponentially in the past decade, from 104 publications in 2008 to over 1,000 in 2018. Defined by Dr. Jon Kabat-Zinn as "paying attention in a particular way, on purpose, non-judgmentally, to the present moment", mindfulness is a practice that changes how one relates to one's present experience, breaking old habits of worry and rumination and cultivating an attitude of acceptance.[175] MBSR is a curriculum-guided intervention that consists of eight 2.5 hour sessions, 45 minutes of daily practice, and a day of mindfulness between Week 6 and 7. Originally developed in 1979 to help patients with chronic pain,[48] it has since shown benefits in clinical and non-clinical settings,[148, 215] with promising results as an educational tool.[58] [1] After just eight weeks of mindfulness practice, benefits have been found in immune response and brain function.[216]

An initial review of the available literature by this research group (described in Chapter 2) found that MBSR was being adapted and successfully delivered to healthcare students, specifically medicine, nursing and psychology.[1] Interestingly, apart from some brief mindfulness taster sessions which lacked the structure or robustness of an MBSR-based course,[199] there was as yet no investigation into the potential benefits of mindfulness on pharmacy students. Focus groups exploring pharmacy students' current experiences of the degree (Chapter 4) found that students were willing to explore the use of mindfulness in this setting.[2] When MBSR was described to them however, a preference for a more condensed version of the course was vocalised, due to an already demanding course workload, and limited time to commit to such training. These discussions, combined with information derived from the literature reviews, informed the final study design i.e. a condensed four-week mindfulness intervention.

The course was initially delivered to pharmacy students in UCC in a face-to-face format, both the quantitative and qualitative results of which are described in Chapters 5 and 6. Most importantly, after completing the course it was found that the intervention group had statistically significantly lower distress levels than the control group p ($F_{(1,98)} = 15.3$, $p<0.005$). Gender-specific effects of programme participation were also found; females demonstrated bigger improvements in perceived stress levels than their male counterparts ($p=0.026$, $p<0.005$). A selection of participants also completed semi-structured interviews, during which they reported a positive change in how they relate to stress in daily life, and an increased ability to cope with difficult thoughts and emotions.

While the "*group dynamic*" and "*interaction with colleagues*" were highlighted by participants as being important components of the face-to-face course, the expansion of such an intervention to pharmacy schools across the country was impeded by logistical issues; travel by the primary researcher to several sites on a regular basis, particularly in the north of the island was not feasible. Coupling this with a growing interest in the effectiveness of mindfulness training delivered via an online platform, it was decided that the development of an online version of the mindfulness course would (i) facilitate the inclusion of all pharmacy students on the island of Ireland in this research, and (ii) allow for an in-depth exploration into an online version of the intervention.

Hence, the aim of this study was to assess the effects of a four-week online mindfulness course for undergraduate pharmacy students. This was a mixed methods study, and both the quantitative and qualitative results are presented in this chapter.

7.3 Methods

7.3.1 Study type

Mixed methods research has been defined by Creswell and Plano Clark as "the collection, analysis and mixing of quantitative and qualitative data in a single study or series of studies."[154] In this study, quantitative data from validated tools were combined with and compared to qualitative data from an open-ended questionnaire in order to assess the effects of an online MBI for undergraduate pharmacy students. The sum of the contributions of quantitative and qualitative data is deemed to be greater than that of each individual method.[66, 67]

7.3.2 Participants and recruitment

Ethical approval for the study was obtained from the CREC of the Cork Teaching Hospitals (Appendix 16). Two of the four institutions also required further submissions to their own respective ethics committees (Appendix 19 and 20).

The online mindfulness course was offered to undergraduate pharmacy students who were enrolled in four other Pharmacy Schools on the island of Ireland for the 2016/2017 academic year; TCD, RCSI, QUB and UU.

Information about the study was provided to students by the primary researcher via a ten-minute presentation, delivered either face to face or via a video recording played during a scheduled lecture. One group of students was off-campus on placement, so the presentation was instead uploaded to their student VLE, to be viewed in their own time. The presentation contained an explanation of mindfulness and what the study would entail, as well as details of how to sign up to the study via the specially created online platform (https://mindpharm.gnomio.com).[217] Here, students could view the participant information leaflet, and electronically complete the consent form. One institution specified that students should complete a paper copy of the consent form, so these were handed out during the presentation, and were subsequently collected by administrative staff and forwarded to the primary investigator.

Once consent had been obtained, participants received an email allocating them either to the intervention or the waitlist control group. Allocation was conducted alphabetically

by surname, and this method was used in order to mirror the process that had been previously carried out for the face-to-face version of the intervention in UCC, as described in Chapters 5 and 6. This allowed for some comparison of results, and reduced the risk of crossover bias due to tutorial groupings.

7.3.3 Procedures

All participants were provided with passwords to access and complete the baseline measures at T1, and the intervention group then took part in the online course. Post-intervention, all participants repeated the online measures at T2, which also included an additional feedback questionnaire about the course for those in the intervention group. The waitlist control group was subsequently given access to the online course, in line with ethical requirements. Prior to analysis, participants were each assigned a unique identifying number, to ensure that data remained anonymous.

7.3.4 Description of the intervention

A preference for a more condensed version of the course was vocalised by pharmacy students during focus groups, due to an already demanding course workload, and limited time to commit to such training.[2] These discussions, combined with information derived from the literature reviews,[1] informed the final study design i.e. a condensed four-week mindfulness intervention.

The course offered to participants was an online version of the face-to-face four-week mindfulness course, and the online course layout is provided in Appendix 3. This course

was an introductory version of the MBSR programme, albeit condensed. The face-to-face version of the course was allocated two hours per class, as it involved logistics such as participants needing time to arrive from previous lectures, as well as interactive elements of inquiry and group discussion. However, an online version of the course required less time to implement; although the same duration was assigned to meditations e.g. body scans, awareness of breathing, there were other elements of the course e.g. mindful enquiries and group activities which, while simulated within the online platform, did not require the same amount of time. Therefore, each online class took approximately one hour to complete. Overall, the course consisted of four one-hour online classes, and 20 minutes of daily practice.

Each week, the intervention group received an email from the primary researcher to inform them that a class had been uploaded to the website, to be completed at a time that suited them, and would be accessible for one week. After six days, a reminder email was sent, to prompt those who had yet to complete the class to do so. The principle investigator was also accessible via email for any technical issues in relation to login or class completion.

7.3.5 Technology

The course was hosted on mindpharm.gnomio.com,[217] a free online platform specifically for hosting e-learning courses. The course required a password in order to be accessed. This helped to ensure that only the intervention group could see and complete the course. The course was created by the primary researcher using Articulate Storyline,[218]

and comprised of a series of slides, samples of which are provided in Appendix 4. Voiceover was added to the content where appropriate. Audios of the guided exercises, and short videos created on Videoscribe [219] illustrating some of the key learnings were also embedded into these screens. A forwards/backwards function was included so that participants could proceed to the next part of the class, or recap on a particular section. At the end of each class, there was a short completion form for participants to submit, which allowed the primary researcher to track who had completed each week's lesson. The same function was also applied to the end of each daily practice audio, for a similar purpose.

7.3.6 Course Design

The primary researcher (a qualified pharmacist) who designed the course, had attended a mindfulness teacher-training course at The Mindfulness Centre for Professional Training in Ireland[202], and had been practising mindfulness for five years. Course content was overseen and approved by an experienced mindfulness teacher (HB) who was trained by senior staff from the University of Massachusetts Center for Mindfulness, including Dr Jon Kabat-Zinn and the other three authors of the original MBSR curriculum; Melissa Blacker, Saki Santorelli and Florence Meleo-Meyer. This standard of supervision and course design ensured that the intervention remained aligned to the intentions of the original MBSR curriculum.

In order to be able to develop an online version of the course which was both accessible and functional, the primary researcher attended a two-day workshop on the use of

Articulate Storyline,[218] and regularly consulted with IT staff in UCC regarding course hosting and reporting mechanisms.

7.3.7 Quantitative measures

All participants filled out an initial online demographics form (Appendix 17), which collected information about gender, age category, nationality, previous degree, experience of working in a pharmacy setting, university and year of study.

Stress was measured using the PSS.[68] This ten-item scale asked participants to rate how often in the last month they had experienced particular feelings or thoughts, with a choice of five response categories ranging from 'never' (0) to 'always' (4). Four questions required reverse scoring, with the total score ranging from 0 (no stress) to 40.

Mood was measured using the GHQ.[70] This test consisted of 12 items, with questions relating to mental distress experienced in the last two weeks. Participants scored each question from 0 to 3, giving a total possible score of 0 (no distress) to 36 (highest distress). A further categorisation was carried out during analysis by allocating a '0' to answers of '0' or '1', and a '1' to answers of '2' or '3'. Categorical scores of 4 or higher were deemed to indicate potentially higher levels of distress.

Burnout was measured using the MBI-SS University Form.[72] This consists of 16 statements of university-related feelings, and participants were invited to rate how often they experienced them, ranging from never (0) to every day (6). Scoring was

divided into three sub-categories; professional efficacy (0-36), exhaustion (0-30) and cynicism (0-30).

Empathy was measured using the JSE-HPS.[76] This was a 20-item scale, consisting of statements about empathy towards patients and their situations. Participants were required to rate each statement from strongly disagree (1) to strongly agree (7). Ten items required reverse scoring, and the overall score (20-140) was used to determine participants' empathy levels.

Mindfulness was measured using the FFMQ.[82] This was a 39 item scale, with each item scored from 'never or very seldom true' (1) to 'very often or always true' (5). Items were divided into the following five categories or 'facets' of mindfulness: (a) observing, (b) describing, (c) act with awareness, (d) non-judgement and (e) non-reactivity.

Intervention participants were also asked to score the course under a number of sub-headings; (a) course content, (b) course relevance, (c) course delivery and (d) course accessibility, with 5 being the maximum possible score, and 1 being the minimum possible score for each category.

7.3.8 Qualitative measures

Qualitative course feedback was obtained post-intervention from participants via a feedback form. This consisted of three questions, with space provided for free-text answers;

(a) What did you enjoy most about the course?

(b) What did you dislike most about the course?

(c) Do you feel that you benefitted from the course and If so, in what ways?

Attendance was reported as the number of classes completed by each participant in the intervention group, from 0-4, as logged electronically at the end of each online session.

7.3.9 Quantitative analysis

Only data from those who completed both T1 and T2 measures were used in the analysis, (per protocol method), as the level of missing data was too high to allow for any other form of analysis. The high drop-out rate of 62.5% was not unexpected due to the logistical and technical challenges encountered. The demographics of those who completed the study were compared to those who dropped out before completion, in order to identify any influential factors in this.

MANCOVA were applied to the dependent variables measured at T2 that related to overall wellbeing (stress, distress, empathy and burnout), while including T1 scores as covariates. The MANCOVA was followed by ANCOVAs to determine the specific elements that produced significant results. These tests were then repeated to examine the effect of the intervention on each of the mindfulness facets.

Due to the multiplicity of testing that was conducted, a Bonferroni correction was applied to the alpha levels, giving a required p value of 0.01 or less. Effect size was calculated using a Partial Eta Squared. The values used for interpreting effect size were small (0.01 or 1%), medium (0.06 or 6%), and large (0.138 or 13.8%). The impact that

level of attendance had on the results was explored using multiple regression methods, controlling for T1.

7.3.10 Qualitative analysis

A thematic analysis approach was applied to the answers given to the free-text questions. The answers provided to the questions by each of the participants, as shown in Appendix 20, were exported into a Microsoft Excel® document, and coded line-by-line by the primary researcher. These codes were then grouped into themes. This process was also conducted independently by a second researcher, and agreement was reached by discussion where required. The frequency of each theme was also evaluated.

7.4 Results

7.4.1 Study flow

Study participant flow is illustrated in Figure 7.1. Only results of the students with full data available (n=52) were analysed. There were no reported harms or unintended effects of the intervention. Due to the varied methods of participant recruitment attributed to student placement and the absence of specific attendance records, it was not possible to determine the exact number of students who received information on the study. The dropout rate from sign-up to completion was 62.5%.

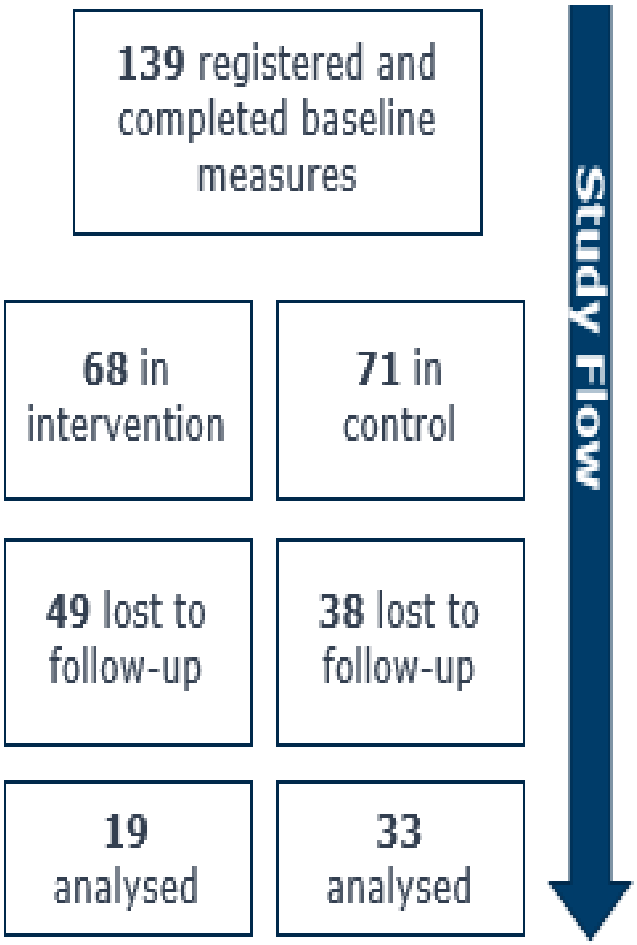

Figure 7. 1 Flowchart describing recruitment and dropout.

7.4.2 Quantitative results

7.4.2.1 Internal validity of the quantitative measures

Table 7.1 presents the Cronbach alpha values which were calculated for each of the quantitative measures completed by participants. All tools, including the JSE-HPS version, (the results of which were not presented for the face-to-face version of the intervention due to insufficient internal validity) achieved acceptable Cronbach alpha values of > 0.70, indicating internal validity of their individual questions.

Table 7. 1 Cronbach alpha values of the quantitative measures

Tool	Measure	Cronbach's Alpha
PSS	Perceived Stress	0.89
GHQ	Clinical Distress	0.88
	(b) Professional Efficacy	0.84
MBI-SS	(b) Exhaustion	0.85
	(c) Cynicism	0.82
	(a) Observing	0.71
	(b) Describing	0.90
FFMQ	(c) Awareness	0.85
	(d) Non-judging	0.89
	(e) Non-reactivity	0.84
JSE-HPS	Empathy	0.77

7.4.2.2 Descriptive analyses and baseline comparison

No significant differences were found in demographics or baseline measures between the intervention and control groups at T1, which meant that subsequent analysis could be conducted without adjusting for any such differences. Baseline demographics are described in Table 7.2. The number of participants in the higher distress category at baseline was 47.4% in the intervention group, and 45.5% in the control group.

Table 7. 2 (a) Demographics of the intervention and control groups at T1

Characteristic N (%)	Overall (N=52)	Intervention (N=19)	Control (N=33)	p-value
Female	40 (76.9)	15 (78.9)	25 (75.8)	1.000
Age (years)				0.954
18-20	29 (55.8)	11 (57.9)	18 (54.6)	
21-23	15 (28.8)	5 (26.3)	10 (30.3)	
24+	8 (13.4)	3 (15.8)	5 (15.2)	
Irish/EU	49 (94.2)	17 (89.5)	32 (97.0)	0.176
Work Experience	38 (73.1)	13 (68.4)	25 (75.8)	0.803
Previous Degree	8 (15.4)	3 (15.8)	5(15.2)	0.622
University				0.623
A	27 (51.9)	12 (63.2)	15 (45.5)	
B	5 (9.6)	1 (5.3)	4 (12.1)	
C	11 (21.2)	3 (15.8)	8 (24.2)	
D	9 (17.3)	3 (15.8)	6 (18.2)	
Year of Study				0.797
1st year	8 (15.4)	4 (21.1)	4 (12.2)	
2nd year	16 (30.8)	5 (26.3)	11 (33.3)	
3rd year	26 (50.0)	9 (47.4)	17 (51.5)	
4th year	2 (3.8)	1 (5.3)	1 (3.0)	

Table 7. 2 (b) Demographics of those who completed the study versus those who dropped out

Characteristic N (%)	Overall (N=139)	Completed (N=52)	Dropped out (N=87)	p-value
Female	109 (78.4)	40 (76.9)	69 (79.3)	0.741
Age (years)				0.309
18-20	84 (60.4)	29 (55.8)	55 (63.2)	
21-23	45 (32.4)	15 (28.8)	30 (34.5)	
24+	10 (7.2)	8 (13.4)	2 (2.3)	
Irish/EU	112 (80.6)	49 (94.2)	63 (72.4)	**0.030**
Work Experience	97 (69.8)	38 (73.1)	59 (67.8)	0.513
Previous Degree	19 (13.7)	8 (15.4)	11 (12.6)	0.956
University				0.156
A	69 (49.6)	27 (51.9)	42 (48.3)	
B	23 (16.5)	5 (9.6)	18 (20.7)	
C	26 (18.7)	11 (21.2)	15 (17.2)	
D	21 (15.1)	9 (17.3)	12 (13.8)	
Year of Study				0.429
1st year	29 (30.9)	8 (15.4)	21 (24.1)	
2nd year	42 (30.2)	16 (30.8)	26 (29.9)	
3rd year	63 (45.3)	26 (50.0)	37 (42.5)	
4th year	5 (3.6)	2 (3.8)	3 (3.4)	

As shown in table 7.2 (b), when the demographics of those who completed the study were compared to those who dropped out, it was found that nationality had a statistically significant effect on completion (p=0.030); almost 100% of those who completed the study were Irish/EU.

7.4.2.3 Effects of the intervention on the main outcome measures

The MANCOVA analysis demonstrated a statistically significant result when testing the effect of the intervention on the main outcome measures (stress, distress, empathy and burnout) compared with the control group ($F_{1, 51}$=3.25, p=0.01). When follow-up

ANCOVAs were applied to this result (Table 7.3), it was found that the intervention had a statistically significant effect on professional efficacy. While stress and distress scores also showed improvements, these results were not statistically significant. The percentage of students in the higher distress category at T2 decreased from 47.4% to 32% in the intervention, and from 45.5% to 32% in the waitlist control group; the decrease was almost identical in both groups.

Table 7. 3 Outcome measures at T1 and T2 for the intervention and control group

	Intervention (N=19)		Control (N=33)		Partial Eta Squared	$F_{(1, 51)}$	p-value
	T1 Mean (SD)	T2 Mean (SD)	T1 Mean (SD)	T2 Mean (SD)			
PSS	22.8 (7.0)	19.0 (7.4)	20.1 (7.0)	20.8 (6.1)	0.079	3.8	0.06
GHQ	15.4 (6.7)	10.9 (8.5)	14.2 (6.0)	14.0 (6.3)	0.071	3.4	0.07
JSE-HPS	112.4 (10.7)	111.5 (13.2)	111.3 (10.7)	112.3 (10.2)	0.022	1.0	0.32
MBI							
• ***Professional Efficacy***	23.2 (7.5)	26.0 (5.9)	22.3 (6.5)	21.4 (7.1)	0.176	9.4	**0.004**
• ***Exhaustion***	18.6 (6.6)	17.1 (7.4)	18.5 (6.6)	19.2 (8.0)	0.057	2.6	0.11
• ***Cynicism***	10.7 (7.7)	10.0 (7.4)	10.4 (7.1)	11.3 (7.9)	0.036	1.6	0.21

7.4.2.4 Effect of the intervention on the mindfulness facets

A MANCOVA analysis with T1 scores as co-variates showed that there was also a statistically significant effect of the intervention on FFMQ results compared to the control group ($F_{1, 51}$=2.57, p=0.01). When ANCOVA analysis was subsequently applied it was found that the difference was present only in the observing facet of the mindfulness test (Table 7.4).

Table 7. 4 Outcome of five mindfulness measures at T1 and T2 for the intervention and control group.

	Intervention (n=19)		Control (n=33)		Partial Eta Squared	$F_{(1, 51)}$	p-value
	T1 Mean (SD)	T2 Mean (SD)	T1 Mean (SD)	T2 Mean (SD)			
Observing	25.1 (4.5)	29.9 (5.5)	25.0 (5.5)	24.7 (6.2)	0.179	9.8	**0.003**
Describing	24.8 (5.2)	28.7 (6.1)	26.2 (7.0)	25.0 (5.7)	0.084	4.1	0.05
Act With Awareness	24.8 (4.9)	25.7 (5.8)	24.6 (6.5)	22.1 (5.9)	0.114	5.8	0.02
Non-Judging	21.5 (9.1)	23.4 (8.7)	22.2 (6.6)	22.3 (7.2)	0.013	0.6	0.45
Non-Reacting	17.9 (4.6)	21.2 (4.0)	19.5 (5.0)	20.8 (4.1)	0.021	1.0	0.33

7.4.2.5 Effect of gender on the outcomes

At baseline T1, there was no difference between males and females for any of the measures. A two-way ANCOVA performed on post-intervention T2 results showed that gender had a statistically significant effect on the impact of the intervention. Females obtained a statistically significantly better perceived stress score than males post-intervention ($F_{1,51}$=2.68, p=0.04, partial eta = 0.091). The opposite was true for the non-judgment facet of the FFMQ; males achieved a bigger improvement in scores than

females. ($F_{1,51}$=4.76, p=0.03, partial eta = 0.092). When the results were split by gender and separate MANCOVAs were carried out, it was found that post intervention results were only statistically significant for females ($F_{1,51}$=2.52, p=0.04, partial eta = 0.359). The intervention did not have an overall effect on male participants.

7.4.2.6 Effect of attendance on the outcomes

On average, participants attended 2.68 classes (SD 1.7), with 52% of intervention participants attending all four classes, and 73% attending at least half of the course. When multiple linear regression was conducted to assess the effect of attendance on T2 scores, while controlling for T1, it was found that attendance levels did not have a statistically significant effect on any of the measures.

7.4.2.7 Course rating scores

The percentage of participants who scored the course either a 4 or 5 out of 5 in each of the categories were as follows: course content (73.7%), course relevance (68.4%), teaching methods (73.7%%) and course accessibility (63.2%). When asked if they benefitted from the course, 89% of participants said that they did.

7.4.3 Qualitative results

When thematic analysis was applied to free-text answers provided by participants (as presented in Appendix 21), the themes shown in Table 7.5 were most frequently identified.

Combining these qualitative findings with the quantitative data described above provided a deeper insight into the feasibility and acceptability of the intervention, specifically in relation to the perceived benefits of the course, and the barriers/facilitators of participation encountered.

Table 7. 5 Most common themes from feedback form free-text answers

Question	Themes Generated	% of participants (N=19)
What did you like most about the mindfulness course?	Learning to become aware of stress and/or difficult thoughts and emotions	36.8 (N=7)
	Stress reduction and relaxation	31.5 (N=6)
	Specific elements of the course content/layout	26.3 (N=5)
What did you dislike most about the mindfulness course?	Trying to find time to complete the course	31.6 (N=6)
	Specific elements of the course content/layout	31.6 (N=6)
	Technical issues with the online format of the course	15.7 (N=3)
What benefit(s) did you obtain from the mindfulness course?	Stress reduction	36.8 (N=7)
	Awareness of thoughts and emotions	31.6 (N=6)
	Calmer mind	26.3 (N=5)

Question 1: What did you like most about the course?

The aspect of the course that participants liked the most was the ability to become aware of stress and/or difficult emotions (36.8%). One student spoke about how they *"really liked the idea of just being with your emotions and not struggling with them."*

(Participant 17) They liked how the course taught them to observe stress and negative emotions, without getting caught up in them.

Although stress was not reduced in a statistically significant way according to the qualitative results, a proportion of participants did report stress reduction in the free-text feedback (31.5%). The course was described as a way of *"forgetting about study and work" (Participant 6)* and of *"being able to relax in the evenings." (Participant 7)* Students used it as a way to switch off and put the pressures of the degree aside, if only for a little while. Although this is not a direct intention of the MBSR course, it was an understandable result from such a condensed, remote format.

Certain aspects of the course content were cited by 26.3% of participants as being what they liked the most. This varied from general statements, "I found the exercises useful and interesting" (Participant 14) to more specific examples, such as *"I liked the explanation in scientific ways. For example, the stress cycle. It really appealed to me as a pharmacy student as we seem to be more calculating and have methodical minds." (Participant 17)*

Question 2: What did you dislike most about the course?

Participants described finding time to complete the course as being a real challenge, with 31.6% naming it as what they enjoyed the least. One student said *"I found it difficult to balance the college work load and find time to complete the weekly course along with some of the homework. I found myself getting stressed about not completing the course in time or doing all the homework." (*Participant 2) Another participant, who described

the struggle to set time aside noted *"I would have loved a face-to-face session." (Participant 1)*

Almost one third (31.6%) of participants disliked specific elements of the course. General examples were given by some participants, such as *"I thought the format of the course became boring and repetitive." (Participant 14)* Others offered more detail, such as *"the body movement exercise, as I felt that the stretches had to be held too long and this made the exercise frustrating and didn't help with my mindfulness." (Participant 11)* This observation was ironic, considering that the purpose of mindfulness practice is to turn towards these very frustrations.

The technology associated with taking part in the online course was cited by 15.7% of participants as what they disliked the most. One participant said *"this interface is not as straight forward as I would like! It has been a little confusing to utilise." (Participant 5)* Another student gave a specific example of how they were unable to log their completion of a class, *"I completed week 2 of the course, but it wouldn't let me do the survey on my phone which was annoying." (Participant 2)*

Question 3: What benefits did you obtain from the course?

About two in five participants (36.8%) reported stress reduction as a benefit that they obtained from the course, with one participant saying that it *"provided relaxation at the*

end of busy days," (Participant 8) and another sharing how *"it taught me how to…try to release my stress somehow before I sleep." (Participant 1)*

Awareness of thoughts and emotions was a benefit of the course that was described by 31.6% of participants, who felt that they *"learnt some very useful techniques to deal with negative thoughts." (Participant 8)* Participants felt that they were able to relate to stress in a more positive way. *"I've learnt that everyone gets stressed but you need to deal with it instead of letting it build up." (Participant 6)*

Getting a calmer mind was a benefit noticed by 26.3% of participants. One participant described their busy mind to be like a *"washing machine,"* and said that the course taught them how to *"zone out" (Participant 12)* from it. Another participant offered the following insight**:** ***"****I think I benefited because it helped me to calm my mind and start taking more care of myself rather than just being consumed by work and stress from pharmacy." (Participant 2)*

7.5 Discussion

This study was successful in its aim of assessing the feasibility and acceptability of an online mindfulness course for undergraduate pharmacy students. However, it is important to state from the outset that due to low sign-up numbers and a 62.5% dropout rate compared to other studies,[64] the findings of the study cannot be used to definitively assess quantitative effectiveness. Hence, caution should be exercised in the interpretation of the quantitative results in particular. Nonetheless, the quantitative

results did trend in a positive direction across the measures. Most notably, benefits were demonstrated in professional efficacy and observation levels, as well as improvements in stress and non-judgement levels for male participants. This is in line with findings from previous studies that explored the effects of online MBIs, and found positive results in these areas.[220, 221]

The qualitative results added an extra dimension to the insights obtained into students' experiences and perceptions of the course, with participants reporting an increase in their ability to relax from the pressures of the pharmacy degree as a result of taking part. The themes generated in response to each of the questions were similar to the benefits reported by other qualitative studies of mindfulness, specifically awareness of thoughts and emotions, and reductions in stress.[205, 222]

The online delivery of this intervention presented its own unique challenges, namely the conflict between the ability to reach people versus the lack of a personal touch, as highlighted by the qualitative findings. While the course was designed to the best possible standard given the limited resources available, some participants still reported trouble in course navigation, and in the logging of class completion. This is further reflected in the low numbers of students who rated "course accessibility" highly (just 63%). Furthermore, these technical issues meant that the class completion record cannot be relied upon – participants may have completed more classes than were actually logged, affecting the attendance results. Ideally, it would also have been favourable to be able to record how long each participant spent working through a class

– as it was unclear if whether they spent the recommended one hour, or advanced quickly through some of the sections.

The low sign-up rate of this study could be attributable to a number of factors: Firstly, although it may be argued that having the course uploaded and available to complete at a time that suited the participant made it more accessible, some students reported that it became just "another thing on their to-do list." In contrast, findings from the interviews conducted with UCC students who completed the face-to-face version of the course identified the timetabling of the course as a positive feature of the intervention, making engagement easier. Also, the analysis that compared those who completed the course and those who dropped out showed that there was statistically significantly more Irish/EU participants completing the study, potentially due to language barrier issues.

Another potential reason for the low sign-up numbers could be the fact that the course was being offered by somebody from another pharmacy school. Students of the face-to-face course spoke about the importance of a "whole-school" approach in order to implement such training going forward, and while the face-to-face intervention was only delivered by one person, it was at least delivered by somebody within the school, who students knew from tutorials or dispensing labs previously. The fact that participants in the online course had no prior knowledge of the primary researcher, and only met her once during recruitment (if at all) could have reduced their inclination to sign up to the course. Ivey *et al* explores this concept, highlighting the importance of strategic implementation and active participation on the part of educators in the effective delivery of MBIs.[223]

Several studies have found online MBIs to be effective, both in a clinical and non-clinical setting,[224, 225] even when directly compared to face-to-face delivery.[226] However, the power of interaction and discussion seems to be favoured by students.[227] In *'Teaching Mindfulness: A Practical Guide for Clinicians and Educators',* McCown and Rebel point to the importance of the sense of group cohesion and personal responsibility to the group, as well as the mutual support offered by a live group which is not achieved in an online format. However, there may still be an important role for online MBIs, particularly where logistics are a significant consideration. Many face-to-face participants in previous research by these authors called for a "*recap*" of what they had learned, and an online platform could serve as an added resource that students could refer back to. Hence, there is a potential role for online access to such training, as an adjunct to face-to-face delivery.

7.6 Conclusion

This study has been a promising first step in designing an online version of a mindfulness course for undergraduate pharmacy students. The combination of quantitative and qualitative data provides a solid base upon which to build future investigations. This was the first study of its kind to offer an online mindfulness course to undergraduate pharmacy students, as well as being the first online intervention of its kind in an Irish setting. Participants reported many of the key benefits that one would hope a mindfulness course would cultivate; stress reduction, a calmer mind, and a recognition

of thoughts as mental events. Future work should examine the usability of the online modality of the course, increase recruitment of students to power the study, and include long-term follow-up.

7.6.1 Acknowledgements

We wish to acknowledge the Heads of School in RCSI, TCD, QUB and UU for granting permission to conduct the study, and the lecturers who kindly offered time during their teaching slots to facilitate recruitment.

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Chapter 8: Discussion

8.1 Discussion

This thesis investigated the role of mindfulness in undergraduate pharmacy education. Chapter 8 summarises the body of work as a whole, as well as offering an interpretation of the overall thesis findings. The chapter begins with a summary of the key findings of each chapter individually, before comparing and contrasting these results to provide greater insights. Implications of the research in the context of existing literature will be explored, and research strengths and limitations discussed. Recommendations for future research in this area, and how to bring these findings forward will also be presented.

8.2 Summary of findings

The overall finding of this thesis was that, similar to other healthcare undergraduate courses,[51, 130, 162, 228] adapted MBIs can reduce pharmacy student distress and stress levels, and improve their levels of mindfulness. Face-to-face delivery was the preferred method of participation; students valued the interaction that this offered. This research also identified the most common barriers and facilitators to participation in such training, which were similar to those found by other studies implementing such interventions.[161, 163]

The initial aim of this research was to review the existing literature in the area of MBIs in undergraduate healthcare and social care undergraduate education. This was an

important starting point, as it provided an evidence-base upon which to develop research questions, and build future interventions. The quantitative systematic review conducted in Chapter 2 found through its narrative synthesis that MBIs were being adapted and successfully delivered to produce improvements in stress,[51, 137, 228, 229] mood[51, 130, 134, 228] and mindfulness levels[137, 228, 229] in specific cohorts of undergraduate healthcare students; namely medicine,[109, 114, 119, 130, 134, 137, 228] psychology[64, 109, 121] and nursing.[51, 127] However, it highlighted an important gap in the literature; the effects of MBIs for pharmacy students. It also identified the most frequently used validated tools for the measurement of wellbeing and mindfulness in this cohort; the GHQ[70] and the FFMQ.[230]

The qualitative systematic review conducted in Chapter 3 added a key layer of understanding to what was known about undergraduate health and social care students' experiences and perceptions of taking part in MBIs. Four main themes were generated through thematic synthesis of the results of the included papers and are detailed below;[65, 161-163]

(i) understanding and engagement;

(ii) benefits - from aim to attitude;

(iii) barriers and facilitators and

(iv) individualised integration.

It became apparent that the benefits students obtained from taking part in such education were varied, from superficial *"aims"* or goal-orientated benefits e.g. improved

concentration,[163] to deeper, more complex positive shifts in how they related to stress and challenges encountered in daily life.[65] It was found that the level of benefit obtained by participants was linked to students' levels of understanding and engagement in the concept, an important consideration when designing any future intervention. Barriers and facilitators to participation such as the timetabling of the intervention, room layout, and peer interaction were identified.[161, 163] This review also served to confirm the gap in the literature previously identified by the quantitative review; no studies that met the inclusion criteria explored the experiences of pharmacy students in this area. It was decided that due to the findings of Chapters 2 and 3, an MBI for undergraduate pharmacy students would be appropriate; a novel, yet important development of the existing research in this area.

Before designing and delivering any such intervention, it was felt that current pharmacy students' experiences of the pharmacy degree, and their opinions regarding mindfulness, including the potential role it could play, would be vital to know in advance. Hence, Chapter 4 comprised the conducting and analysis of focus groups with pharmacy students across the island of Ireland. Participants were asked about their current stress levels and how they were coping, as well as whether they felt mindfulness had a role to play as part of the curriculum, and the best ways to introduce it. The key themes that emerged from the thematic analysis conducted on focus group transcripts were:

(i) so much to do, so little time,

(ii) the role of lecturers,

(iii) we're smart people, we want to do well,

(iv) learning by doing and

(v) mindfulness as a coping tool.

These findings showed that students were often overwhelmed and struggling with the workload of the pharmacy degree, combined with personal and financial pressures. They welcomed the idea of mindfulness as part of the pharmacy degree, particularly for its practical, experiential nature. Important insights into what students would deem accessible in terms of intervention design were obtained; of particular note was a concern that the standard eight-week MBSR course would be too long, and should be condensed. This was reflective of the views of other healthcare student cohorts,[51, 228] and was not surprising, considering the time intensive nature of the pharmacy degree.

The results from Chapter 4 were combined with those from previous chapters, and a four-week mindfulness course, based on the MBSR was designed and delivered to undergraduate pharmacy students on the island of Ireland in the 2016/2017 academic year. Chapter 5 describes the quantitative results obtained from the face-to-face delivery of this intervention to UCC pharmacy students; there was a significant decrease in mental distress measured by the GHQ[70] in the intervention group compared to the wait-list control ($F_{(1,98)} = 15.3$, $p<0.005$), with females' stress levels measured by the Perceived Stress Scale[68] improving significantly ($p=0.026$). Higher attendance levels predicted these findings ($p<0.005$).

Chapter 6 explored these findings further, through qualitative interviews with a selection of participants. The themes that emerged from these interviews were:

(i) pre-course expectations,

(ii) course experience and

(iii) post-course reflections.

In general, students reported feeling more aware of their emotions, and better able to deal with their stress. Participants valued the group dynamic and the safe environment, and advised that future interventions should remain optional, but suggested that mindfulness should be a whole-school approach, perhaps as part of a larger mental health programme, rather than simply an isolated intervention.

Due to the logistical issues of delivering such an intervention in four other pharmacy schools on the island of Ireland, as well as a growing body of research around the effectiveness of online mindfulness courses,[220, 225] it was decided to offer the undergraduate pharmacy students of RCSI, TCD, QUB and UU an online version of the four-week mindfulness course. Chapter 7 describes the process involved in the design and creation of this format, as well as both the quantitative and qualitative findings of this study. It was found that there was a statistically significant increase in professional efficacy as measured by the MBI-SS[72] ($p=0.004$), and improved observation scores as per the FFMQ[230] ($p=0.003$) post-intervention. Students reported via free-text answers a reduction in their stress levels and an ability to notice thoughts and emotions more

clearly. However, the lack of formal inclusion of the course in their timetable, coupled with a variety of technical issues proved to be problematic for many.

Each chapter of this thesis provides valuable results in its own right, as well as cumulatively contributing to the overall quality and comprehensiveness of the research. Chapters 2-4 laid a solid foundation of knowledge upon which the intervention designs of Chapters 5-7 were based.

The systematic reviews of Chapters 2 and 3, while differing in methodology (i.e. quantitative and qualitative), played complementary roles in informing the subsequent intervention design. Both reviews identified the gap in the literature in relation to the use of MBIs in pharmacy education, while each review also offered unique insights that the other did not e.g. the quantitative review identified the most appropriate tools to utilise, while the qualitative review was useful for anticipating potential accessibility issues, and the range of benefit levels that participants could experience. Chapter 4 contributed further to this knowledge, adding the essential perspective of pharmacy students, while expanding upon the challenges of implementation already identified in Chapter 3 e.g. timetabling and incentivisation.

The results of Chapter 5 were reflective of the findings described in Chapter 2. In particular, the reduction of distress levels and the effect of gender on such outcomes had previously been encountered in other undergraduate healthcare cohorts.

Furthermore, the findings of student interviews in Chapter 6 offered an additional dimension of understanding to the results of Chapter 5. While interview participants qualitatively describing the reductions in distress that had been demonstrated in Chapter 5's quantitative analysis, the interviews also facilitated an exploration of what students hoped to gain from participation, and how best to proceed with such findings. The valuable qualitative insights of this chapter were not unlike those found in Chapter 3; the themes of the review (e.g. spectrum of benefits from aim to attitudinal, the importance of engagement, individualised integration) were very evident in the contributions of the pharmacy student participants.

Chapter 7's online delivery of the intervention provided an interesting comparison to the results of Chapters 5 and 6. For example, while distress was reduced in the face-to-face intervention, this result was not duplicated in the online cohort. The absence of group interaction for online participants could potentially be a reason for this; the positive effect of engaging with colleagues as part of the MBI was described by participants in Chapter 6, and had also been identified as a key factor of a beneficial course in Chapter 3. Conversely, professional efficacy was improved for the online cohort only. A possible reason for this could be the discipline required to schedule participation into one's own timetable.

8.3 Interpretation and implications of findings

While studies and reviews of the use of MBIs in university settings, and in healthcare education in particular continue to be published,[231-235] this thesis provides a unique contribution to the literature; it is the first study of its kind to offer evidence for the use of MBIs in undergraduate pharmacy education. It has demonstrated that, with the correct approach to adaptation and integration, MBIs can be used effectively to equip pharmacy students with the ability to learn self-care as well as patient care as part of their curriculum. The findings of this thesis complement and add to those from previous studies in similar cohorts e.g. social work, medicine and nursing.[51, 65, 162, 236-238]

The results presented as part of this thesis should serve as a stimulus for greater engagement with the issue of self-care in pharmacy education, as it provides much information about what is needed by students, and which approaches work best for effective integration. Two key areas for engagement with different stakeholder groups have been identified:

(i) pharmacy education at an undergraduate level, and

(ii) pharmacy regulators and professional bodies.

8.3.1 Undergraduate pharmacy education

The findings of Chapter 4, which highlighted that that pharmacy students are stressed, overwhelmed, and very often struggling to juggle the demands of the degree with personal and financial commitments, cannot be ignored; educators in pharmacy schools and colleagues from their respective faculties are in a position to address these issues.

The range of benefits reported in Chapters 5-7 for students who took part in the MBI are promising, and participants believed that mindfulness does have a place in the curriculum going forward.

Overall, the findings of this thesis indicate that pharmacy educators need to implement a strategy to introduce mindfulness as part of the undergraduate pharmacy curriculum. A successful implementation strategy would include early introduction (i.e. first year students) via a compulsory introductory series of classes, incorporating an exploration of the scientific basis for its use. This would ensure that all students are given equal opportunity to experience what the training involves, as well as neutralising any stigma around taking part, and fears of being viewed as "struggling." Older year groups would then need to be offered subsequent optional refresher courses. Timetabling of these courses is imperative, as shown by the findings of Chapters 4-6 versus Chapter 7.

Also worth noting is that elsewhere, a broader approach towards self-care education has proved successful. Several university courses have effectively incorporated MBIs as part of a larger wellness initiative; didactic stress reduction, nutrition education, leadership workshops, yoga and CBT.[172, 235, 239-241] For this to occur in the undergraduate pharmacy setting, the *"whole-school approach"* that was identified as being imperative in Chapter 6 needs to be cultivated. Consultations with course co-ordinators, education of pharmacy school staff about the initiative, and spiral integration of such an ethos into the curriculum must take place in the respective pharmacy schools to support successful implementation.

8.3.2 Pharmacy professional bodies

While based in the undergraduate setting, the findings of this research have natural links to the pharmacy profession, and hence the professional bodies (both regulatory and representative) who are interested in supporting their members' continuing professional development. The stress of the undergraduate degree, and the need for self-care do not cease upon leaving university. Practising pharmacists have been shown internationally to demonstrate excessive stress in their workplace environment.[35-37] Unfortunately, in the Irish setting, there is limited information available about practising pharmacists' stress levels, apart from a recent poll conducted in September 2018 by PharmaBuddy ™, a forum for Irish community pharmacists. When asked *"How would you rate the level of stress you experience working as a pharmacist?"* (1 being the lowest, 5 being the highest), 76% of 282 respondents reported either "high (4)" or "very high (5)" levels of stress.[242] Bodies such as the IIoP, and the Irish Pharmacy Union (IPU) who endeavour to create learning opportunities and to provide the pharmacy profession with the support that it needs,[43, 243] are in a prime position to address these figures via preventative action around self-care and mental health CPD, rather than the current *cures* being offered such as counselling and treatment, usually availed of at a point where pharmacists are no longer able to cope.[244] These organisations need to take the finding of this thesis as a basis for creating and delivering an MBI that pharmacists can avail of, both in a face-to-face and online capacity. This type of initiative will help to

normalise and destigmatise the notion of self-care, opening up a conversation around mental health issues within the profession as well as amongst members of the public.

8.4 Strengths and limitations

One of the key strengths of this thesis is the solid research foundation upon which all chapters are based. Both the quantitative and qualitative systematic reviews (Chapters 2 and 3) were conducted according to the PRISMA guidelines,[104] and adhered to appropriate data extraction, quality appraisal and reporting standards throughout.[157, 203] The findings of these reviews were coupled with the valuable advice of a specially convened Project Advisory Committee, composed of experts in the areas of pharmacy education, psychology and mindfulness research, as well as industry and hospital pharmacists, and a pharmacy student representative. Hence, the subsequent research undertaken (Chapters 4-7) was suitably tailored to address the key deficits identified in the literature in an effective and accessible way.

Another important strength of this research is the mixed-methods approach that was taken from the outset; the combination of quantitative and qualitative research is recognised as being more insightful than either method on its own.[153, 154] The quantitative results provided tangible figures upon which to base an initial understanding of the benefits of the intervention. However, not all benefits were necessarily captured by the results of these tools; qualitative data added to the findings

to provide a deeper, fuller insight into students' perceived benefits or lack thereof, as well as important information upon which to base future intervention design.

The level of national and international dissemination of this research to date is testament to the quality of this research, and its relevance in healthcare and pharmacy education today. All six research chapters have either already been published in peer-reviewed journals,[2, 245] or are currently under review. The strategy for targeting journals has been to engage researchers from a wide range of backgrounds, from pharmacy, healthcare to psychology, from academics and educators to practicing professionals. Findings have been presented at conferences locally, nationally and internationally, in poster, oral presentation and workshop formats. This confirms the standard of the research methods employed, and the value that these findings add to existing research. Future efforts shall be made to further disseminate these findings, and use them to affect change in the education of our pharmacy and other healthcare professional students in the future.

Although there are many strengths associated with this research, there are also a number of limitations to be acknowledged. Firstly, only those students who provided full data in Chapters 5-7 were analysed, and this could potentially be skewing the results, due to a self-selection bias; only students who were interested in the area of mindfulness, stress reduction and self-care are represented, and this needs to be taken into account when interpreting the findings or conducting further research in this field.

Another limitation of the study was that "*true randomisation*" of participants did not occur; due to timetabling restrictions, participants were allocated alphabetically by surname to either the intervention or the control group. Ideally, purely random allocation to one of the groups would have occurred. Nonetheless, it was reassuring to note that despite this quasi-randomisation method, there were no differences in demographics or other measures at baseline between the groups that needed to be taken into account in the analyses.

Recruitment numbers being low and a high drop-out rate are limitations that have been discussed in previous chapters and cannot be overlooked. Particularly in Chapter 7, the online intervention was completed by a disappointingly low number of students. Although these issues are common across mindfulness studies,[51, 137, 162] there is a need to improve the standards of such research, through better recruitment strategies in particular, in order for the results to carry more weight and gain momentum in terms of dissemination and influencing policy at local, national and international level.

8.5 Recommendations for future work

This thesis is extensive in relation to its background literature reviews and implementation of mixed-methods research methods, and serves as an ideal starting point upon which to base future research in the area of mindfulness and self-care in

pharmacy education. However, there is great scope for expanding the findings out in the form of future work.

A key finding of this research was that mindfulness cannot and should not be an isolated attempt at ticking the self-care box. Future research would explore the understanding, perceptions and opinions of pharmacy school staff in this area, in order to better understand what approach would facilitate the collaboration of Faculty within the educational institutions.

Theoretically, any positive results that were found during the interventions described in this thesis would be of benefit to students throughout their degrees and into the future careers. However, studies have found that such benefits are not necessarily maintained at follow-up. Future research would attempt to follow these students after attainment of their degree and into the workplace as pharmacists, to determine what benefits, if any, were maintained, and to decide whether such education should be integrated throughout the degree programme, rather than at an isolated point in time, in order to maximise the benefits obtained. A recent follow-up publication by de Vibe *et al*[143] which delivered twice yearly recap sessions of mindfulness practice post-intervention found that positive effects were still present six years post the intervention.

There is also a potential place for mindfulness education as part of inter-professional learning (IPL), defined as learning where "*two or more professionals learn with, from and*

about each other to improve collaboration and the quality of care."[246] One of the common challenges that IPL encounters is students' inability to see past the differences between their courses, hindering co-operation and teamwork between the professions.[247] Education in an area like mindfulness would be a potentially beneficial way to foster a sense of group cohesion between different healthcare courses; participants in the interventions described in this thesis discussed the important realisation that they were "*all in the same boat*," an understanding that would stand any IPL initiative in good stead, and encourage cohesion cooperation between students in different healthcare courses. Future research would be beneficial to investigate the potential role of mindfulness in this area.

8.6 Conclusions

The overall aim of this thesis was to investigate the effects of MBIs in undergraduate pharmacy education. It was found that pharmacy students are experiencing considerable stress in relation to the degree, as well as personal, social and financial challenges. The MBI that was designed as part of this research; based upon existing literature and student recommendations, was found to have positive effects, both quantitatively and qualitatively, on student stress, distress and burnout levels. The interactive nature of the course, and the creation of a *"safe environment",* which was considered to be *"totally different"* to anything else that they had experienced as part of the degree to date were welcomed. Of particular note was the link between engagement

and effect; those who engaged more fully, reported greater shifts in how they relate to stress, while less engagement led to more superficial benefits overall. Face-to-face delivery prompted more engagement, hence better results were reported. Importantly, students felt that mindfulness is *"not for everybody",* and this needs to be reflected in any implementation going forward. Optional participation, perhaps with a compulsory introductory element in order to maximise students' understanding of the concept and the opportunity to benefit from it, combined with a variety of mental health promotion approaches were felt by participants to be important components of any solution.

Overall, this thesis has opened the door to the implementation of self-care as well as patient care in pharmacy education, in addition to adding to the existing literature in the general healthcare education setting. It has highlighted the importance of life-wide as well as life-long learning in this cohort. Results provide important direction for the research, and should be used to guide further development of such education going forward.

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Appendices

Appendix 1: Mindfulness training certificate of completion

This is to certify that

Michelle O'Driscoll

has successfully completed the taught and residential components of an 18- month Professional Training in Mindfulness-Based Approaches.

H. Byrne J. Lynch.

Directors: Helen Byrne Josephine Lynch

Date: 23rd June 2017

The Mindfulness Centre for Professional Training in Ireland

Co. Reg. 552127 www.mindfulness.ie

Appendix 2: Face-to-face mindfulness course outline

	Activity	Type	Description	Time* (mins)
Week 1	***Guided Arrival***	*Meditation*	*Short reflection to help participants to settle/arrive.*	*5*
	Introduction	*Didactic teaching*	*Background to mindfulness and this particular course.* *General housekeeping.*	*10*
	Group Agreement	*Group activity*	*Decide as a group what conditions would make this group a "safe space" to share experiences, e.g. confidentiality, respect.*	*10*
	Reflection	*Meditation and inquiry*	*Guided meditation around the question "what has brought me here?"*	*5*
	Introductions	*Group activity*	*Each participant shares their name and something about their intention for attending.*	*15*
	Awareness Exercise	*Meditation and inquiry*	*Guided meditation relating to awareness/autopilot, followed by discussion in pairs, and then group inquiry.*	*15 & 15*
	Attitudinal Foundations	*Group activity and didactic teaching*	*Discussion in smaller groups about "what makes a good friend", and using these answers to teach the attitudinal foundations of mindfulness.*	*5*
	Body Scan	*Meditation and inquiry*	*Guided body scan, followed by a short group inquiry.*	*25 & 5*
	Daily Homework	*Meditation and informal practice*	• ***Body Scan*** • ***Routine Activity to be completed mindfully***	*20-30*
Week 2	***Body Scan***	*Meditation and inquiry*	*Guided body scan, with a more detailed inquiry than last week.* *Also explore the experience of home practice.*	20 & 20
	"Walking Down the Street"	*Group activity*	*Short reflection, followed by group discussion about the variety of what was experienced within the group, and how mood/thoughts are linked – reactivity and the role it plays.*	15
	Awareness of Breathing	*Meditation and inquiry*	*Guided meditation on awareness of breathing, followed by a group inquiry.*	10 & 10
	Mindful Movement	*Meditation and inquiry*	*Guided movement sequence, followed by a group inquiry.*	15 & 15
	Daily Homework	*Meditations and written reflection*	• ***Awareness of Breath and Body*** • ***Alternate Body Scan and Mindful Movement*** • ***Pleasant Events Calendar***	*30*

Week 3	***Mindful Movement***	Meditation and inquiry	*Shorter version, followed by a group inquiry about this exercise and the daily practice.*	20 & 15
	Pleasant Events Calendars	*Inquiry and group activity*	*Inquiry about written homework, and a sample calendar created from the group's examples.*	15
	Sitting Meditation	*Meditation*	*Awareness of breath, body, sounds and thoughts, and lead straight into next meditation.*	10
	Unpleasant Events	*Meditation and inquiry*	*A shorter version of turning towards difficulty – awareness of thoughts emotions and body sensations, while using an anchor. Followed by sharing in pairs, and then a group inquiry.*	10 & 10
	Stress	*Didactic teaching, group activity and inquiry*	*Teaching about the physiology of stress* *Group activity – finish the sentences "I get stressed when…" and "When I get stressed I…"* *Follow with inquiry into variety of answers.*	20
	"The Guest House"	*Poetry and inquiry*	*Poem read aloud, followed by a short inquiry into what could be taken from it e.g. turning towards or allowing difficult emotions in daily life*	*5*
	Daily Homework	*Meditations and informal practice*	• *Alternate Sitting Meditation, Mindful Movement or Body Scan* • *Notice stress in daily life*	*20-30*
Week 4	**Sitting Meditation**	*Meditation and inquiry*	*Awareness of breath, body, sounds, thoughts and choice-less awareness* *Followed by group inquiry into this practice and home practice*	20 & 10
	"Johnny Was Walking To School"	*Group activity and inquiry*	*Short reflection, a group inquiry to illustrate the concept that "thoughts are not facts".*	20
	"Autobiography in Five Chapters"	*Poem and inquiry*	*Poem read aloud, followed by an inquiry into what message could be taken from it e.g. the difficulty of breaking old habits, how awareness is a gradual process.*	5
	Bringing Mindfulness Forward	*Group activity and inquiry*	*Discussion about strategies to establish a regular mindfulness practice, and integrate it into daily life going forward*	15
	Guided Reflection	*Meditation*	*Guided meditation reflecting on what was wanted from the course, what was gained, what will be taken forward.*	15
	Final Words	*Group activity*	*Each participant to say something about what they learned or will take away from the course.*	15

Appendix 3: Online mindfulness course outline

ONLINE WEEK 1

1hr class – online delivery. Duration of reflections the same length as the face to face class, but discussions are shortened

Guided Arrival	• into the body, feeling the seat, feet on floor etc.	**3mins**
Introduction	• The course, the research, etc. • Definition of Mindfulness as per Jon Kabat-Zinn • Beginners mind in terms of what is here for us right now. Funny person has freedom to deal with not so funny things, bright person has the gift of being allowed to ask the silly questions. Surprised at what is actually here for us. Each experience is a new one.	3mins
Reflection	• What has brought me here – allow the first answer that comes to mind to slip aside -.what has really brought me here. Maybe it comes up for you as a colour or a feeling. Maybe nothing is coming to mind. Just noticing what if anything is here for you.	**5mins**
Awareness Exercise	• Sight, touch, sound, smell and taste • Coming out of autopilot.	**15mins**
Discussion	• What did you notice? • Good experience of waking up • Bad experience of not liking the taste, not being able to concentrate. Explore all of these.	5mins
Attitudinal Foundations	• What are the qualities of a true friend? • Teach this. Short and to the point. Mindfulness would be very cold and clinical without these attitudes to warm it up. Remember to add in beginners mind, and non-striving	2mins
Body Scan	• Awareness in different areas of the body • Wandering mind – returning to the breath	**25mins**
Discussion	• Short discussion of what came up for people • Explore this more next week	2mins
Homework	• Body scan • Routine Activity	

ONLINE WEEK 2

1hr class – online delivery. Duration of reflections the same length as the face to face class, but discussions are shortened

Body Scan	• Shorter version	**20mins**
Discussion	• What did you notice in today's body scan? Horizontal, then deeper inquiry. • Let people come up with different obstacles, and then make a note that these are not unique experiences. They have been around for thousands of years. We are not trying to get rid of them, but to explore them. What is it like to be restless? How does it feel in your body to be frustrated? • Homework – what did you notice? Routine activity inquiry restlessness, sleepiness, doubt of yourself and the practice, not wanting, wanting. • Wandering mind – bringing it back over and over, exercising the muscle of mindfulness with kindness • Routine activity – different lenses, fresh perspectives	5mins
Walking Down the Street	• Reflection • Discussion – different experiences • ABC of reactivity – depends what lenses you are looking through. Mood affects thoughts	3mins
Sitting Meditation	• Mindfulness of the breath in the body (Where in the body do you feel it? Expansion and release, etc.)	**10mins**
Discussion	• What did you notice? No right or wrong experience to have • Discuss how the breath is always there, acts as an anchor for the wandering mind. How was it to notice the breath?	3mins
Mindful Movement	• Standing	**15mins**
Discussion	• How was that experience – what came up? • Striving, not going far enough? • Fertile edge – most learning. Getting to know ourselves and our patterns	4mins
Homework	• Mindfulness of the Breath • Alternate Body Scan and Mindful Movement • Pleasant Events calendar	

ONLINE WEEK 3

1hr class – online delivery. Duration of reflections the same length as the face to face class, but discussions are shortened

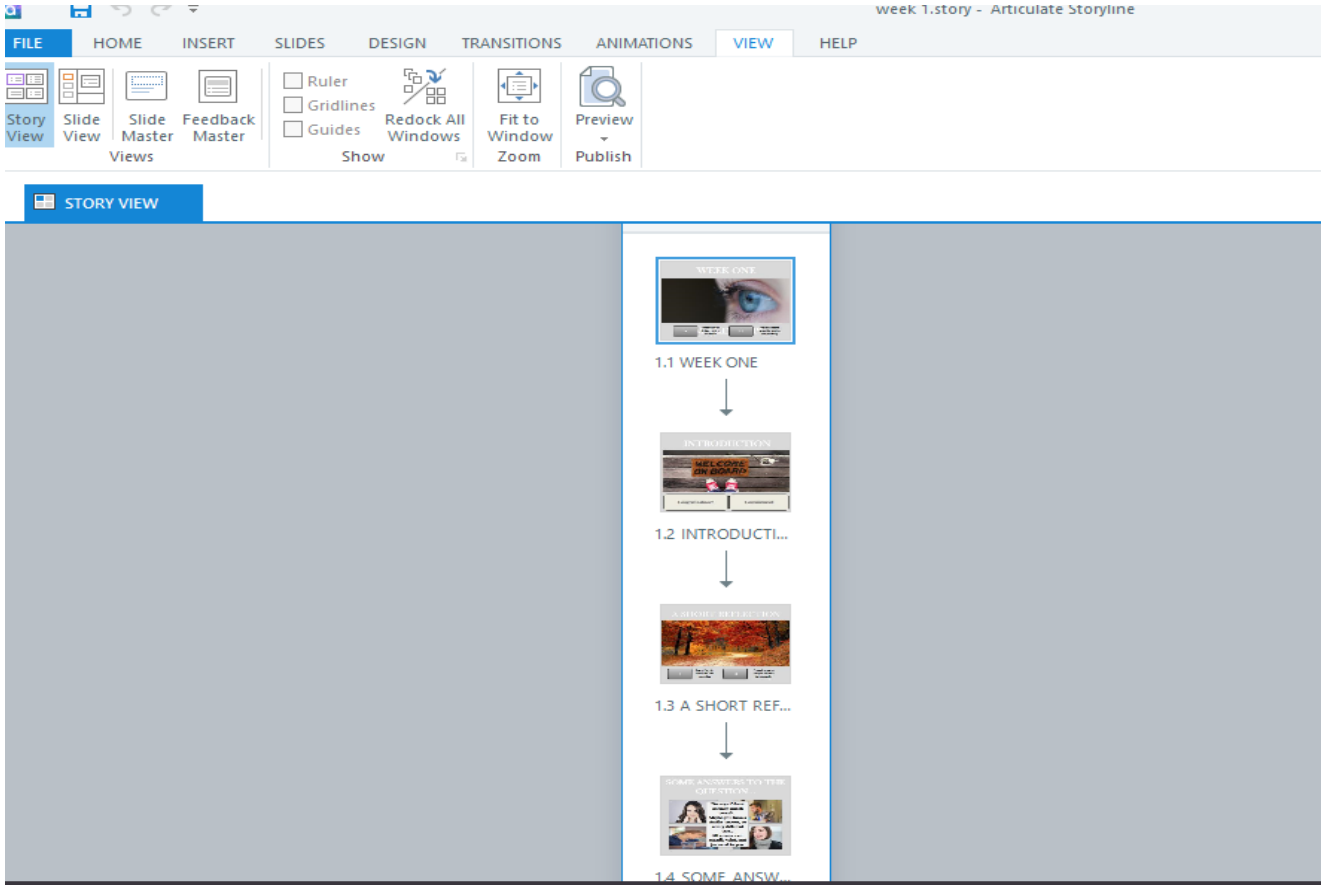
Mindful Movement	• Shorter version - Standing	**20mins**
Discussion	• That experience – what did you notice? • Fertile edges, challenges, over-trying, • Homework – what did you notice	3mins
Pleasant Events Calendars	• What did you notice? Offerings of examples of pleasant events. • Attempting to unpack our experiences – not a simple nice or not nice, made up of complex components – body thoughts and emotions	4mins
Sitting Meditation	• breath body sounds • short stretch to end	**10mins**
Bringing to mind an unpleasant event	• Not the worst thing or most unpleasant thing to happen this week. On scale of 1-10 pick a 4 or a 5 – enough charge to cause a reaction in the body, but not so much that you'll get overwhelmed here and now, for the sake of an exercise. Body sensations, thoughts, feelings.	**10mins**
Inquiry	• What did you notice? Maybe not as bad as you thought? Breaking it down helped? Knowing it's there but not needing to sort it straight away? etc.	3mins
Stress	• Physiology of stress - Why it happens, when it becomes a problem. • Group exercise "I get stressed when." and "When I get stressed I…". Groups of 3 writing answers on sheets. Put all answers in a circle for the group to see. • Discussion about above exercise - the types of things that cause stress, often out of our control. The commonality between people's experiences – we're all in the same boat!	5mins
Ending Reflection - The Guest House	• Change some words "as best you can", "he or she", leave out "laughing", "maybe" invite them in", "a guide from within"	**5mins**
Homework	1. Alternate sitting meditation (breath body sounds emotions) with either the mindful movement or with the body scan 2. Noticing stress in daily life, without trying to change it	

ONLINE WEEK 4

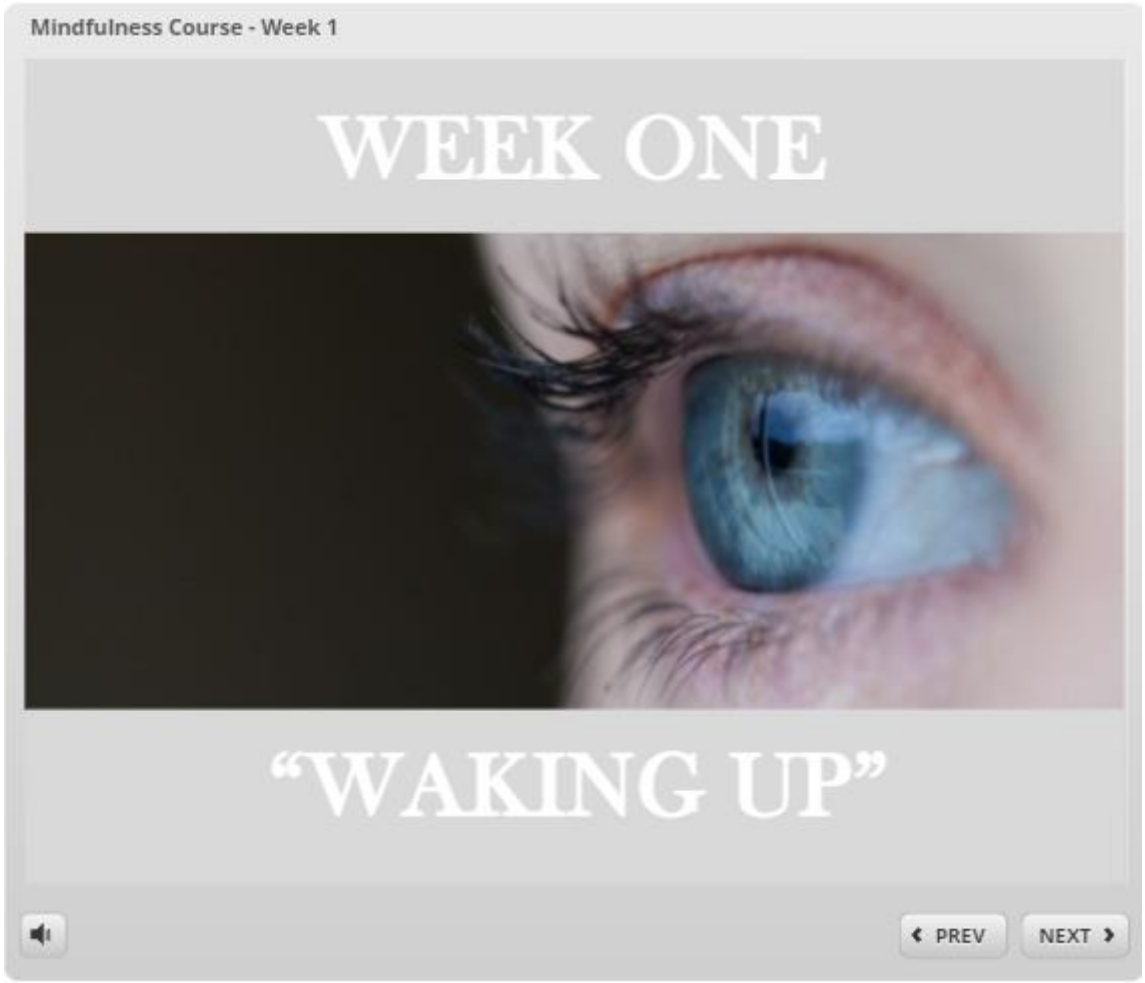
1hr class – online delivery. Duration of reflections the same length as the face to face class, but discussions are shortened

Sitting Meditation	• body, breath, sounds, thoughts as events and choice-less awareness. • Giving options to deal with what comes up – move, breathe into, move away from, noticing sensations, thoughts and emotions.	**20mins**
Discussion	• What did you notice in this exercise? Horizontal and then deep.	2mins
Homework Discussion – Noticing Stress	• What did you notice? How did you react or respond? Did you notice particular patterns in your response to stress? Can we learn from those patterns? Are there better choices that you can make in the future? It's not the stress, but the way we deal with it.	3mins
Thoughts are not facts	• Johnny was walking to school - reflection. • How the above exercise shows that thoughts are not facts, even the ones that tell us they are! • Discuss the tape of the mind, which plays the same "film reel" over and over again. The mind makes a good servant but not a great master. • Not getting caught up in thoughts – clouds across the sky, people walking past a window, standing behind a waterfall, etc. • Don't try to get rid of them, you will never succeed! • Harry potter excerpt • "opening the hand of thought", allowing the butterfly to land and then leave when it's ready. Thoughts versus feelings cycle, and how by taking the experience into the body, and focusing on the sensations and feelings, the cycle can be broken	7mins
Autobiography in Five Chapters	• Responding instead of reacting – helps to break the destructive cycle.	3mins
Mindful Stretch	• Coming into the body, breath in body, sensations etc.	**10mins**
Guided Reflection	• What you wanted from this experience • What you got from this experience • What will you take away with you? • How do you plan to practice going forward?	**15mins**

Appendix 4: Online mindfulness course sample screenshots



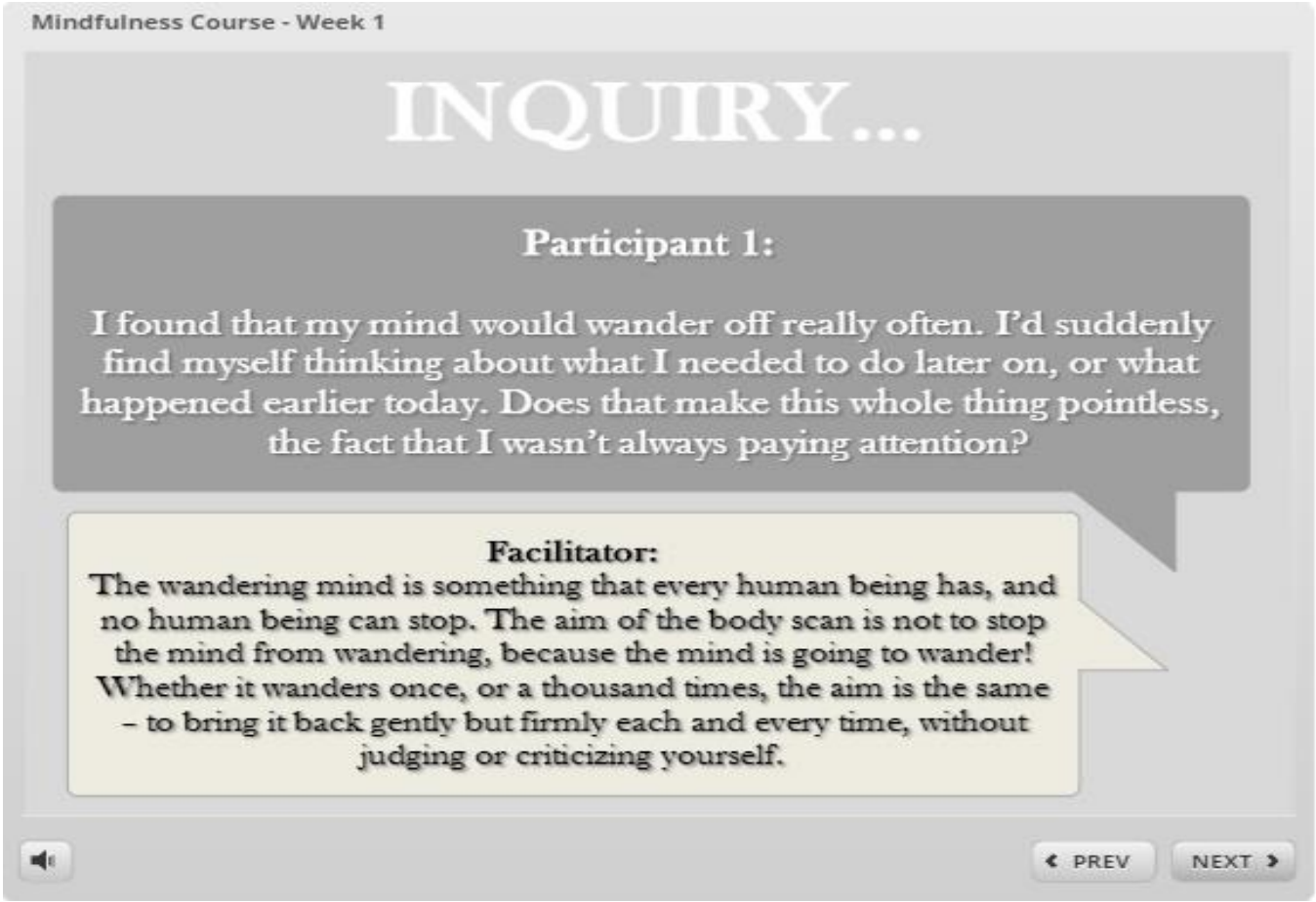
Workflow screen from Articulate Storyline editing function



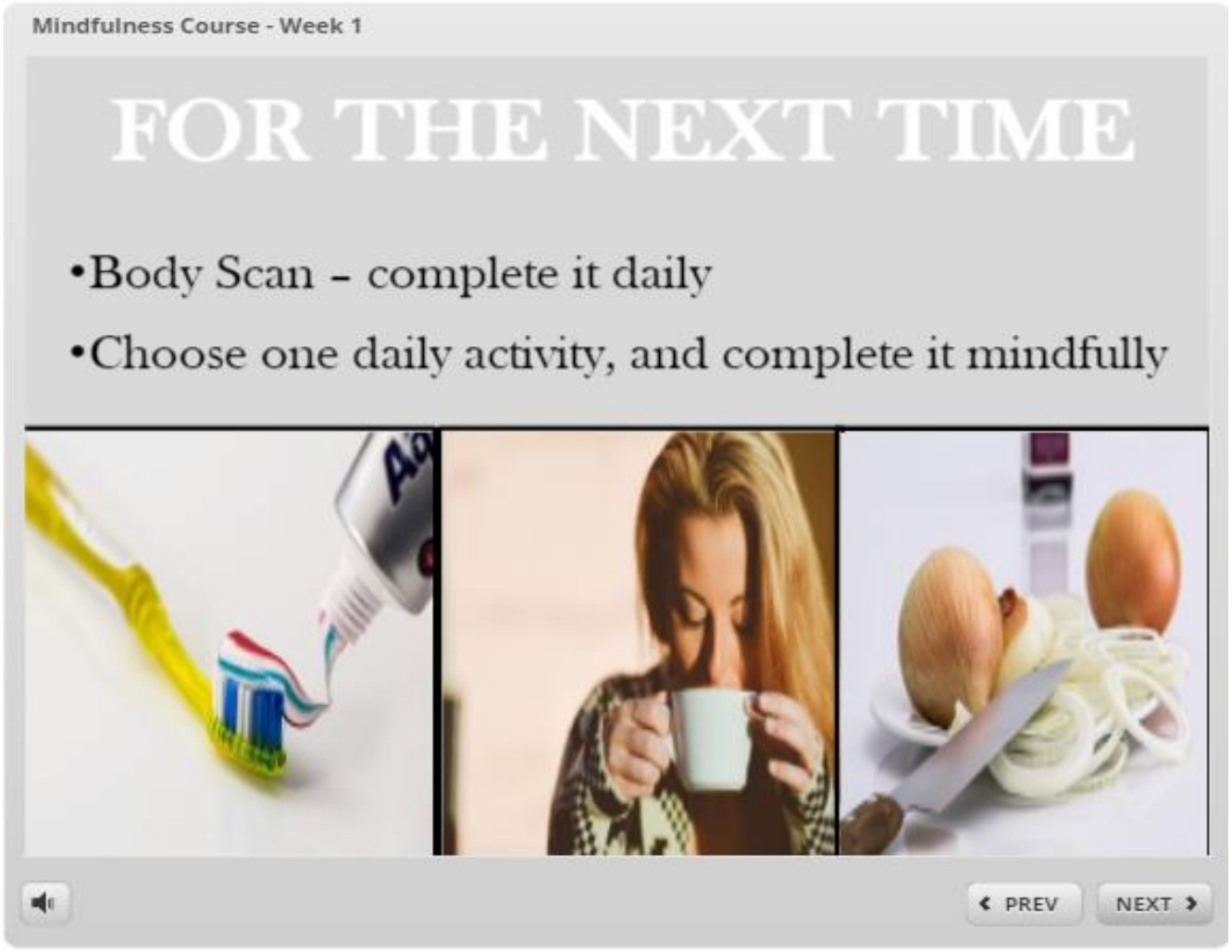
Opening screen from Week 1

Still image from animated Introduction section in Week 1, created with Videoscribe

Screen for completing audio exercise during the course, and for daily practice



Screen showing simulated inquiry/discussion – sample observations from participants, and responses from the facilitator



Sample screen for list of weekly homework

Appendix 5: "Mind Your Mind" mobile application

Student: Hugh O'Dwyer

Supervisors: Dr Sabin Tabirca and Tamara Vagg

Masters' Thesis Title: A Mobile Application to Monitor and Promote Personal Wellness

(Extract taken from student's Master's thesis submission as an example of what was designed on our behalf).

Brief of ideal functions for the app:

- **App Icon** - Click on this to get to the Login Details/Create account screen.
- **Login Details / Create account** - Required only the first time using the app.
- **Create a username and password** - password remembered thereafter.
- **Disclaimer** - To appear after logging in, click "I Agree" to allow the person to gain access. Only required for first login.
- **Home Screen** - icons to choose from here, with usability features as described below:
    1. Daily practice –access mindfulness audios, track your practice, and set reminders.
        - "Practice Calendar"

- A screen that shows the current month, a square for each day, and a star in the square if a practice has been completed.
- You can see at a glance what days have stars, and what days don't.
- Able to scroll back through previous months also.

▪ "Mindfulness Audios "

- Contains a choice of audio files to listen to, click on the audio of choice.
- Appropriate picture on screen during audio playing, with a countdown clock to show how much time is left.
- Pause button also.
- Button that appears when audio is finished, "Practice Complete" to record a star in the Practice Calendar, and to inform friends in your group that you have done your practice.
- List of audios available.

2. Gratitude diary – acknowledge the pleasant parts of your day to increase wellbeing.
3. Stress tracker – keep a record of your stress levels. Two icons on this screen – "How Am I Today?" and "Stress History"

i. “How am I today?” – Rate your stress levels today. Sliding scale, or smiley/sad faces, and a “Save” button.

ii. “Stress History” – a screen that shows a graph of previous stress ratings by the user.

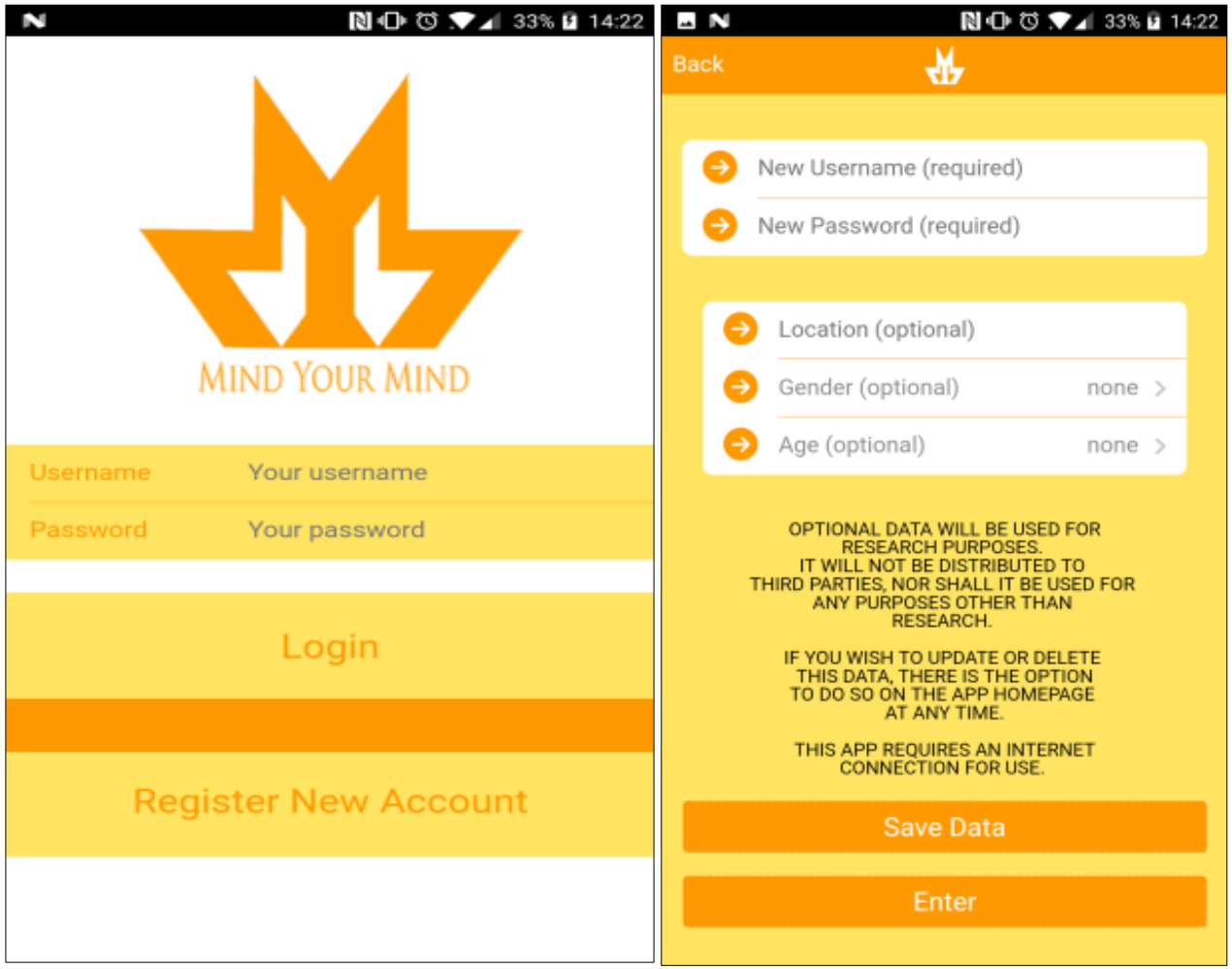
4. Connect with friends – encourage one another to practice mindfulness

5. Links and references – learn more about mindfulness

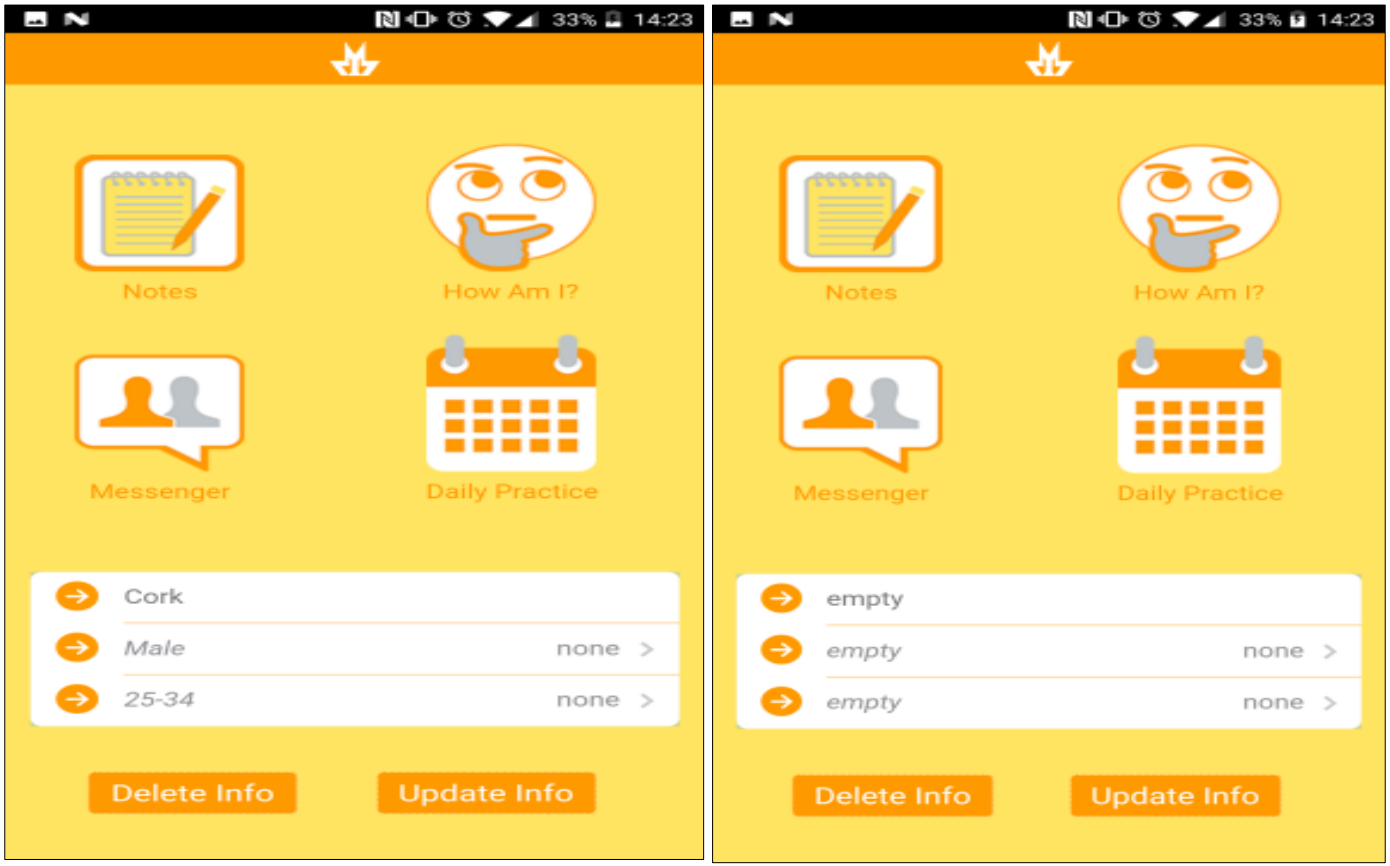
6. Practice Reminder - A screen that allows the user to set a daily alarm at a chosen time, to remind them to practice.

Visual Images of the "Mind Your Mind" App:

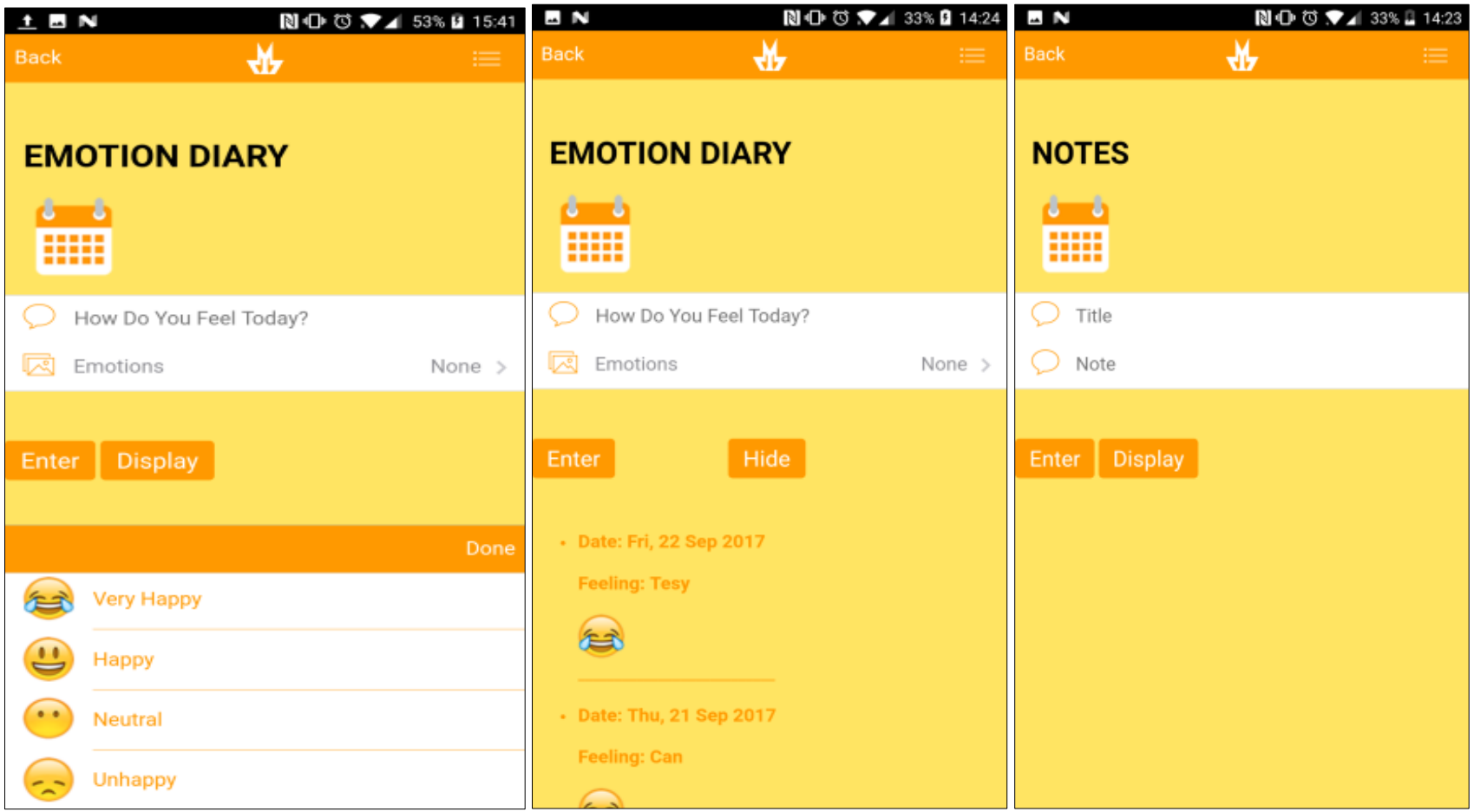
The logo (left) and icon on a phone's home screen (right).



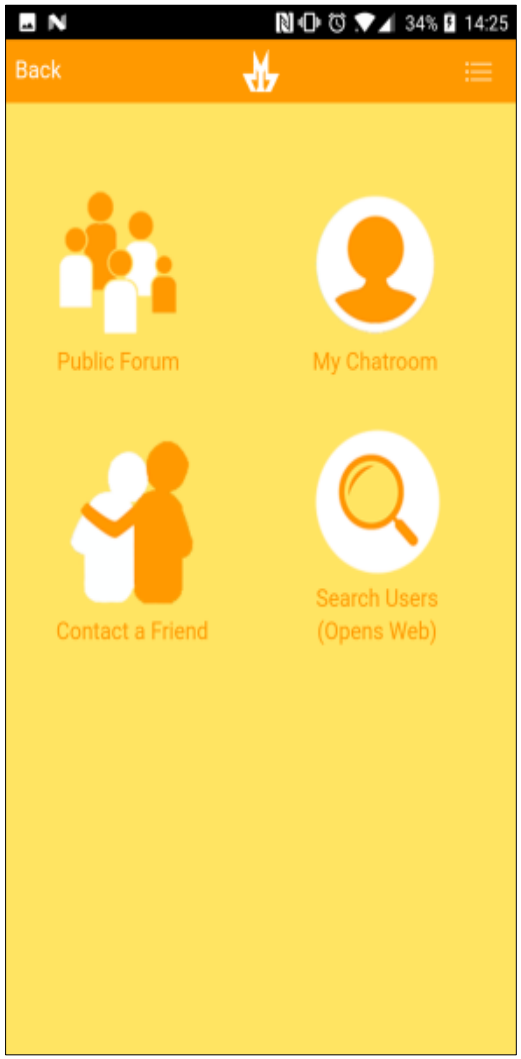
Screenshots of the Login and Registration Screens.



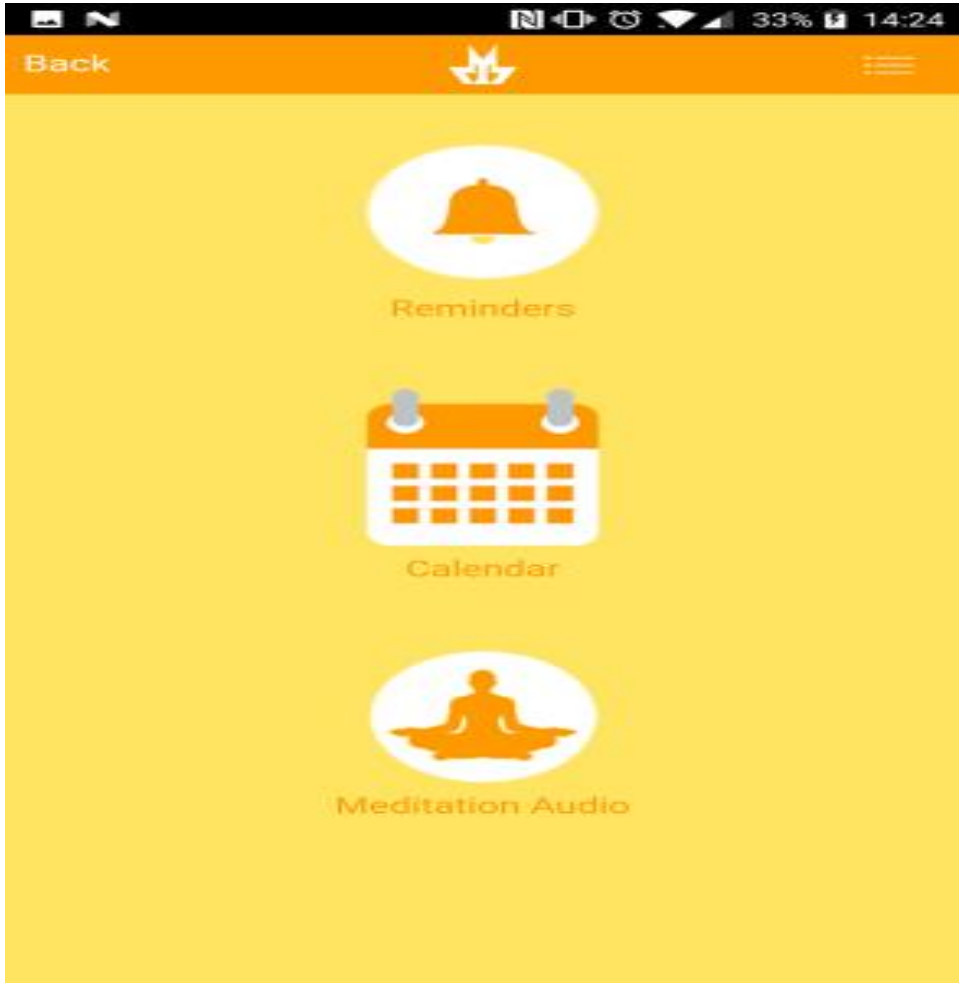
Screenshots of the home screen with filled (left) and unfilled (right) data fields.



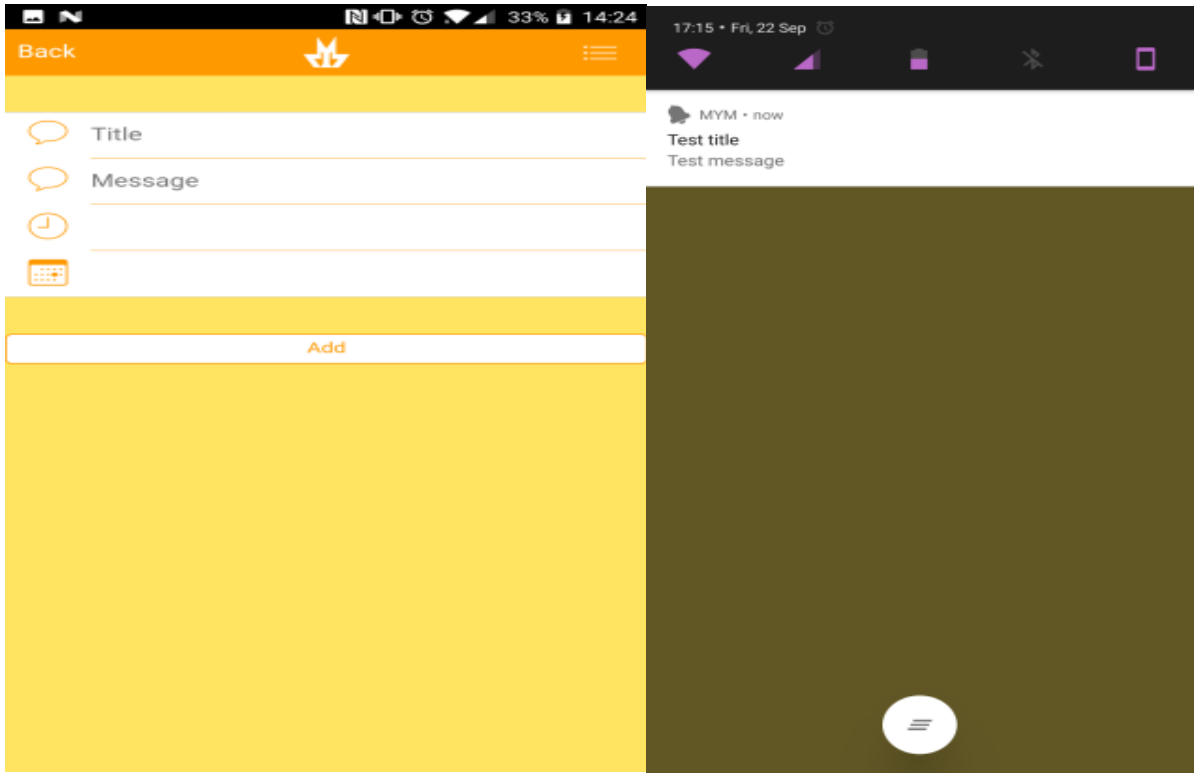
Screenshots of the Emotion Diary and Notes Pages.



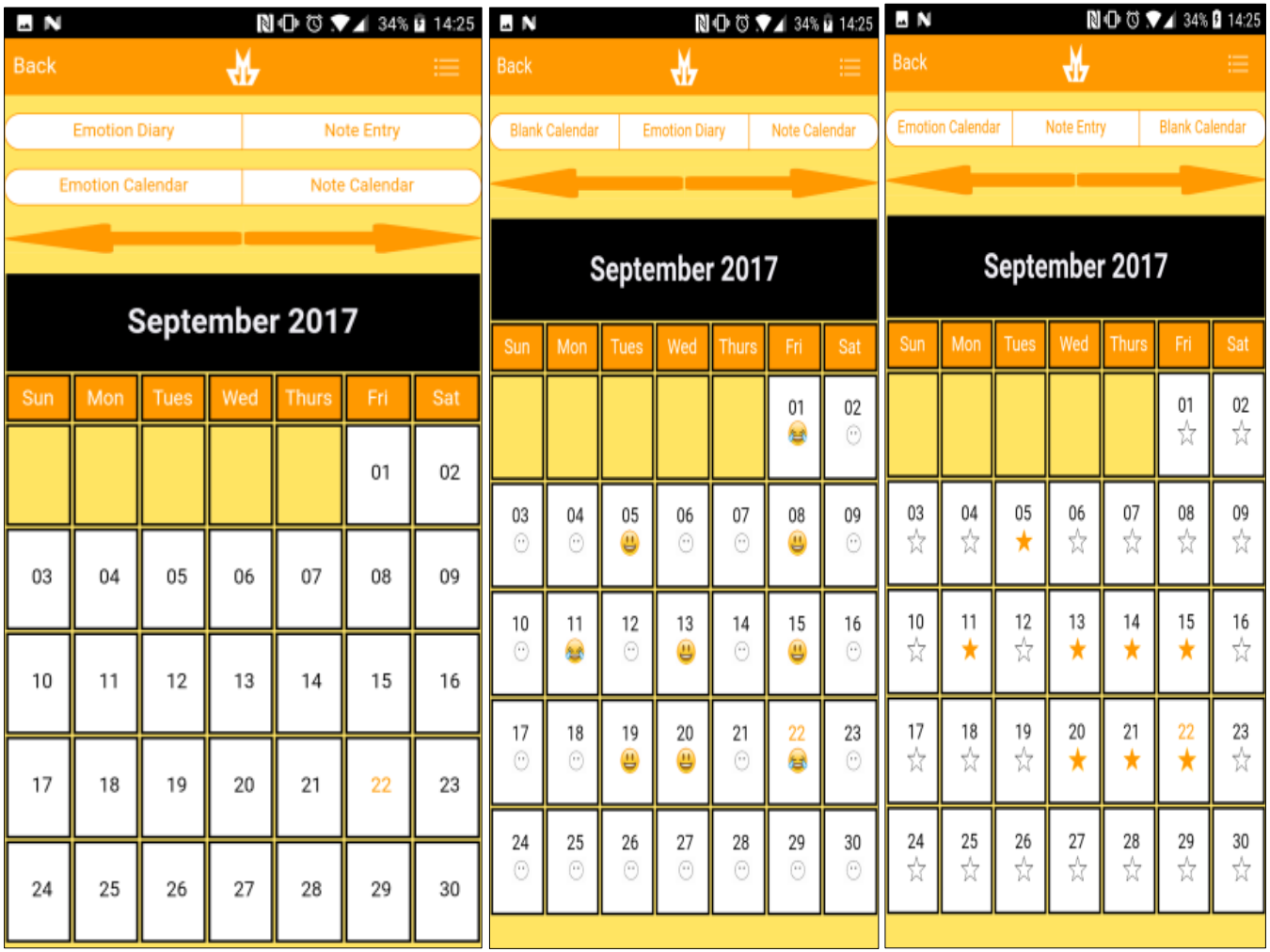
Screenshots of Messenger menu (left).



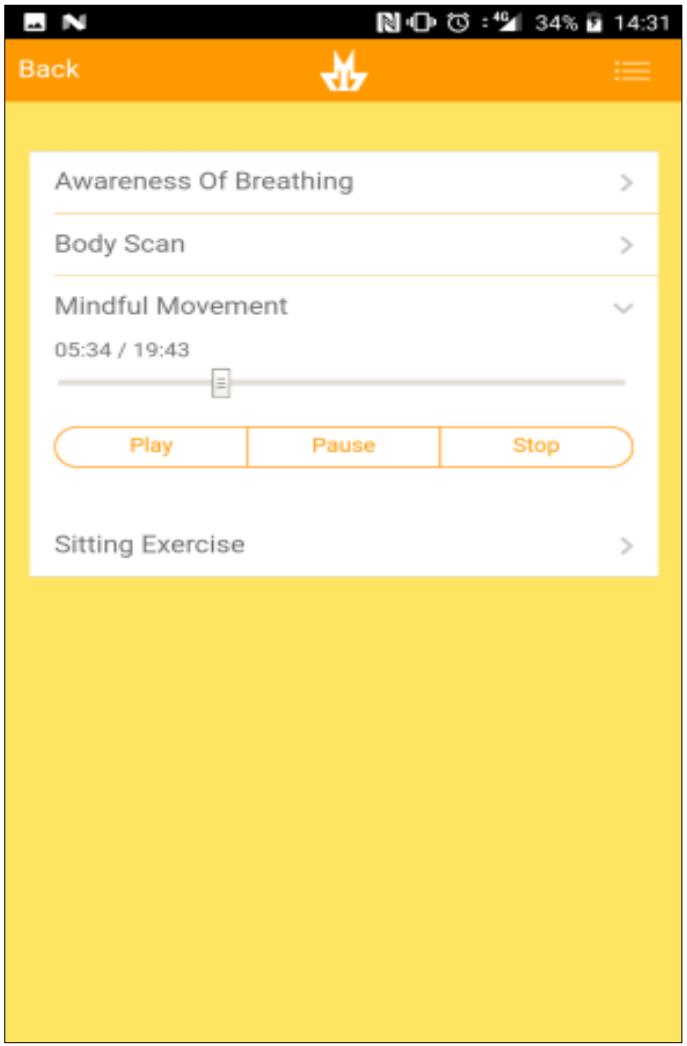
Screenshot of the Daily Practice Menu.



Screenshot of the Reminder creation page (left) and an example of a reminder (right).



Screenshots of the Blank Calendar (left), the Emotion Diary Calendar (centre), and the Note Calendar (right).



Screenshot of Meditation Audios. The slider reflects the playback time of the audio

Appendix 6: PRISMA checklist for quantitative systematic review

Section/Topic	Checklist Item	Reported
TITLE	1. Identify the report as a systematic review, meta-analysis, or both.	yes
ABSTRACT		
Structured Summary	2. Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.	yes
INTRODUCTION		
Rationale	3. Describe the rationale for the review in the context of what is already known.	yes
Objectives	4. Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	yes
METHODS		
Protocol and registration	5. Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.	yes
Eligibility criteria	6. Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.	yes
Information sources	7. Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	yes

Search	8. Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	yes
Study selection	9. State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	yes
Data collection process	10. Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	yes
Data items	11. List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	yes
Risk of bias in individual studies	12. Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.	yes
Summary measures	13. State the principal summary measures (e.g., risk ratio, difference in means).	n/a
Synthesis of results	14. Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I2) for each meta-analysis.	n/a
Risk of bias across studies	15. Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).	yes
Additional analyses	16. Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.	n/a
RESULTS		
Study selection	17. Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons	yes

	for exclusions at each stage, ideally with a flow diagram.	
Study characteristics	18. For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations.	yes
Risk of bias within studies	19. Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12).	yes
Results of individual studies	20. For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot.	yes
Synthesis of results	21. Present results of each meta-analysis done, including confidence intervals and measures of consistency.	n/a
Risk of bias across studies	22. Present results of any assessment of risk of bias across studies (see Item 15).	yes
Additional analysis	23. Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]).	n/a
DISCUSSION		
Summary of evidence	24 Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers).	yes
Limitations	25 Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias).	yes
Conclusions	26 Provide a general interpretation of the results in the context of other evidence, and implications for future research.	yes

FUNDING		
Funding	27 Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review.	n/a

Appendix 7: PROSPERO registration for quantitative systematic review

PROSPERO
International prospective register of systematic reviews

NHS
National Institute for Health Research

UNIVERSITY of York
Centre for Reviews and Dissemination

Systematic review

1. * Review title.

Give the working title of the review, for example the one used for obtaining funding. Ideally the title should state succinctly the interventions or exposures being reviewed and the associated health or social problems. Where appropriate, the title should use the PI(E)CO/S structure to contain information on the Participants, Intervention (or Exposure) and Comparison groups, the Outcomes to be measured and Study designs to be included.

The effects of mindfulness-based interventions for health and social care undergraduate students: a systematic review of the literature

2. Original language title.

For reviews in languages other than English, this field should be used to enter the title in the language of the review. This will be displayed together with the English language title.

3. * Anticipated or actual start date.

Give the date when the systematic review commenced, or is expected to commence.
01/11/2015

4. * Anticipated completion date.

Give the date by which the review is expected to be completed.
30/04/2016

5. * Stage of review at time of this submission.

Indicate the stage of progress of the review by ticking the relevant Started and Completed boxes. Additional information may be added in the free text box provided.
Please note: Reviews that have progressed beyond the point of completing data extraction at the time of initial registration are not eligible for inclusion in PROSPERO. Should evidence of incorrect status and/or completion date being supplied at the time of submission come to light, the content of the PROSPERO record will be removed leaving only the title and named contact details and a statement that inaccuracies in the stage of the review date had been identified.
This field should be updated when any amendments are made to a published record and on completion and publication of the review. If this field was pre-populated from the initial screening questions then you are not able to edit it until the record is published.

The review has not yet started: No

Review stage	Started	Completed
Preliminary searches	Yes	Yes
Piloting of the study selection process	Yes	Yes
Formal screening of search results against eligibility criteria	Yes	Yes
Data extraction	Yes	Yes
Risk of bias (quality) assessment	Yes	Yes
Data analysis	Yes	Yes

Provide any other relevant information about the stage of the review here (e.g. Funded proposal, protocol not yet finalized).

Not funded.

Not funded.

6. * Named contact.

The named contact acts as the guarantor for the accuracy of the information presented in the register record.

Michelle O'Driscoll

Email salutation (e.g. "Dr Smith" or "Joanne") for correspondence:

7. * Named contact email.

Give the electronic mail address of the named contact.

michelle.odriscoll@ymail.com

8. Named contact address

Give the full postal address for the named contact.

School of Pharmacy

Cavanagh Pharmacy Building

University College Cork

College Road

Cork

9. Named contact phone number.

Give the telephone number for the named contact, including international dialling code.

00353868371432

10. * Organisational affiliation of the review.

Full title of the organisational affiliations for this review and website address if available. This field may be completed as 'None' if the review is not affiliated to any organisation.

School of Pharmacy, University College Cork

Organisation web address:

https://www.ucc.ie/en/pharmacy/

11. * Review team members and their organisational affiliations.

Give the title, first name, last name and the organisational affiliations of each member of the review team. Affiliation refers to groups or organisations to which review team members belong.

Ms Michelle O'Driscoll. Lead Researcher, PhD student, UCC School of Pharmacy
Professor Stephen Byrne. Co-supervisor - UCC School of Pharmacy
Dr Laura Sahm. Co-supervisor - UCC School of Pharmacy
Ms Aoife McGillicuddy. PhD student, UCC School of Pharmacy
Dr Sharon Lambert. Advisory, UCC School of Psychology

12. * Funding sources/sponsors.

Give details of the individuals, organizations, groups or other legal entities who take responsibility for initiating, managing, sponsoring and/or financing the review. Include any unique identification numbers assigned to the review by the individuals or bodies listed.

No external funding to date

Dr. Laura Sahm, Prof. Stephen Byrne - as listed above - both acting as co-supervisors.

13. * Conflicts of interest.

List any conditions that could lead to actual or perceived undue influence on judgements concerning the main topic investigated in the review.

None

14. Collaborators.

Give the name and affiliation of any individuals or organisations who are working on the review but who are not listed as review team members.

Dr Sharon Lambert. UCC School of Psychology

15. * Review question.

State the question(s) to be addressed by the review, clearly and precisely. Review questions may be specific or broad. It may be appropriate to break very broad questions down into a series of related more specific questions. Questions may be framed or refined using PI(E)COS where relevant.

What are the effects of mindfulness-based interventions for health and social undergraduate students?

What tools are used to measure these effects?

What are the limitations of the available research to date, and are there any gaps in the literature?

What effect does shortened courses have on results obtained (if any)

16. * Searches.

Give details of the sources to be searched, search dates (from and to), and any restrictions (e.g. language or publication period). The full search strategy is not required, but may be supplied as a link or attachment.

The sources to be searched are: PubMed, EMBASE, PsycINFO, CINAHL, the Cochrane Database of

Systematic Reviews, and Academic Search Complete.

No publication period restrictions will be applied, and papers available in the English language will be

included.

17. URL to search strategy.

Give a link to a published pdf/word document detailing either the search strategy or an example of a search strategy for a specific database if available (including the keywords that will be used in the search strategies), or upload your search strategy.Do NOT provide links to your search results.

Alternatively, upload your search strategy to CRD in pdf format. Please note that by doing so you are consenting to the file being made publicly accessible.

Yes I give permission for this file to be made publicly available

18. * Condition or domain being studied.

Give a short description of the disease, condition or healthcare domain being studied. This could include health and wellbeing outcomes.

The effects of mindfulness-based interventions on health and social care undergraduate students.

19. * Participants/population.

Give summary criteria for the participants or populations being studied by the review. The preferred format includes details of both inclusion and exclusion criteria.

Health or social care undergraduate students.

20. * Intervention(s), exposure(s).

Give full and clear descriptions or definitions of the nature of the interventions or the exposures to be reviewed.

The intervention will be either a course of mindfulness-based stress reduction (MBSR) or mindfulness-based cognitive therapy (MBCT), or a format considered close to equivalent. Any studies which follow this format as an intervention are eligible for inclusion, while studies which only use short meditations without a foundation in one of these courses will be excluded.

21. * Comparator(s)/control.

Where relevant, give details of the alternatives against which the main subject/topic of the review will be compared (e.g. another intervention or a non-exposed control group). The preferred format includes details of both inclusion and exclusion criteria.

Studies that use a separate control group - waitlist, passive or active will be included in the review.

22. * Types of study to be included.

Give details of the types of study (study designs) eligible for inclusion in the review. If there are no restrictions on the types of study design eligible for inclusion, or certain study types are excluded, this should be stated. The preferred format includes details of both inclusion and exclusion criteria.

There will be no restrictions on the type of study design to be included.

23. Context.

Give summary details of the setting and other relevant characteristics which help define the inclusion or exclusion criteria.

24. * Main outcome(s).

Give the pre-specified main (most important) outcomes of the review, including details of how the outcome is defined and measured and when these measurement are made, if these are part of the review inclusion criteria.

The review will report all effects of mindfulness-based interventions, focusing on the most commonly reported effects e.g. reduced stress, burnout etc.

Timing and effect measures

The review will report on any follow-up that included studies conduct e.g. 6 months post intervention.

25. * Additional outcome(s).

List the pre-specified additional outcomes of the review, with a similar level of detail to that required for main outcomes. Where there are no additional outcomes please state 'None' or 'Not applicable' as appropriate to the review

None.

Timing and effect measures

26. * Data extraction (selection and coding).

Give the procedure for selecting studies for the review and extracting data, including the number of researchers involved and how discrepancies will be resolved. List the data to be extracted.

When the preliminary search is carried out, results will initially be screened by title, then by title and abstract.

Each step will be carried out by two individuals, and where there is a difference in opinion, communication via a third party will take place in order to come to a decision.

27. * Risk of bias (quality) assessment.

State whether and how risk of bias will be assessed (including the number of researchers involved and how discrepancies will be resolved), how the quality of individual studies will be assessed, and whether and how this will influence the planned synthesis.

The Cochrane Risk of Bias Tool will be used, but not as a means of exclusion/inclusion.

28. * Strategy for data synthesis.

Give the planned general approach to synthesis, e.g. whether aggregate or individual participant data will be used and whether a quantitative or narrative (descriptive) synthesis is planned. It is acceptable to state that a quantitative synthesis will be used if the included studies are sufficiently homogenous.

We will provide a narrative synthesis of the findings from the included studies, structured around the type of intervention, target population characteristics, type of outcome and intervention content.

A limited scope for meta-analysis is expected because of the range of different outcomes measured across the small number of existing trials.

29. * Analysis of subgroups or subsets.

Give details of any plans for the separate presentation, exploration or analysis of different types of participants (e.g. by age, disease status, ethnicity, socioeconomic status, presence or absence or co-morbidities); different types of intervention (e.g. drug dose, presence or absence of particular components of

intervention); different settings (e.g. country, acute or primary care sector, professional or family care); or different types of study (e.g. randomised or non-randomised).

We plan to explore the subgroups of male versus female.

30. * Type and method of review.

Select the type of review and the review method from the lists below. Select the health area(s) of interest for your review.

Type of review

Cost effectiveness
No

Diagnostic
No

Epidemiologic
No

Individual patient data (IPD) meta-analysis
No

Intervention
Yes

Meta-analysis
No

Methodology
No

Narrative synthesis
No

Network meta-analysis
No

Pre-clinical
No

Prevention
No

Prognostic
No

Prospective meta-analysis (PMA)
No

Review of reviews
No

Service delivery
No

Synthesis of qualitative studies
No

Systematic review
Yes

Other
No

Health area of the review

Alcohol/substance misuse/abuse
No

Blood and immune system

No

Cancer
No

Cardiovascular
No

Care of the elderly
No

Child health
No

Complementary therapies
No

Crime and justice
No

Dental
No

Digestive system
No

Ear, nose and throat
No

Education
No

Endocrine and metabolic disorders
No

Eye disorders
No

General interest
No

Genetics
No

Health inequalities/health equity
No

Infections and infestations
No

International development
No

Mental health and behavioural conditions
No

Musculoskeletal
No

Neurological
No

Nursing
No

Obstetrics and gynaecology
No

Oral health
No

Palliative care
No

Perioperative care
No

Physiotherapy
No

Pregnancy and childbirth
No

Public health (including social determinants of health)
No

Rehabilitation

No
Respiratory disorders
No
Service delivery
No
Skin disorders
No
Social care
No
Surgery
No
Tropical Medicine
No
Urological
No
Wounds, injuries and accidents
No
Violence and abuse
No

31. Language.

Select each language individually to add it to the list below, use the bin icon to remove any added in error.
English

There is an English language summary.

32. Country.

Select the country in which the review is being carried out from the drop down list. For multi-national collaborations select all the countries involved.
Ireland

33. Other registration details.

Give the name of any organisation where the systematic review title or protocol is registered (such as with The Campbell Collaboration, or The Joanna Briggs Institute) together with any unique identification number assigned. (N.B. Registration details for Cochrane protocols will be automatically entered). If extracted data will be stored and made available through a repository such as the Systematic Review Data Repository (SRDR), details and a link should be included here. If none, leave blank.

34. Reference and/or URL for published protocol.

Give the citation and link for the published protocol, if there is one

Give the link to the published protocol.

Alternatively, upload your published protocol to CRD in pdf format. Please note that by doing so you are consenting to the file being made publicly accessible.

Yes I give permission for this file to be made publicly available

Please note that the information required in the PROSPERO registration form must be completed in full even if access to a protocol is given.

35. Dissemination plans.

Give brief details of plans for communicating essential messages from the review to the appropriate audiences.

Attendance at conferences, submission for publication to appropriate peer reviewed journals

Do you intend to publish the review on completion?

Yes

36. Keywords.

Give words or phrases that best describe the review. Separate keywords with a semicolon or new line. Keywords will help users find the review in the Register (the words do not appear in the public record but are included in searches). Be as specific and precise as possible. Avoid acronyms and abbreviations unless these are in wide use.

Mindfulness

Healthcare

Social care

students

stress

37. Details of any existing review of the same topic by the same authors.

Give details of earlier versions of the systematic review if an update of an existing review is being registered, including full bibliographic reference if possible.

38. * Current review status.

Review status should be updated when the review is completed and when it is published. For newregistrations the review must be Ongoing.

Please provide anticipated publication date

Review_Completed_not_published

39. Any additional information.

Provide any other information the review team feel is relevant to the registration of the review.

Accepted for publication in Psychology Health and Medicine.

40. Details of final report/publication(s).

This field should be left empty until details of the completed review are available.

Give the link to the published review.

Appendix 8: Sample systematic review search strategy

Database: Psych Info

Search 1: mindfulness OR "mindfulness based stress reduction" OR "MBSR" OR "mindfulness based cognitive therapy" OR "MBCT"

Search 2: "healthcare personnel" OR "caregiver" OR "social care worker" OR "social care workers" OR doctor* OR physician* OR dentist* OR "psychology student" OR "psychology students" OR psychologist* OR pharmacy OR pharmacist* OR nursing OR nurse* OR "occupational therapy" OR "speech and language therapy" OR "speech and language therapist" OR "speech and language therapists" OR student* OR psychiatry OR psychiatrist* "occupational therapist" OR "occupational therapists" OR "speech therapy" OR "speech therapist" OR "speech therapists"

Search 1 AND Search 2

Other databases searched: PubMed, EMBASE, CINAHL, The Cochrane Library, and Academic Search Complete.

Appendix 9: Cochrane risk of bias assessment tool for quantitative systematic review

Code	Domain Summary	Paper Summary	Overall Summary
L	Low risk of bias	Low risk of bias for all key domains	Most information is from studies at low risk of bias
H	High risk of bias	High risk of bias for more than one key domain	Enough information at high risk of bias to affect results
U	Unclear risk of bias	Unclear risk of bias for one or more key domain	Most information is from low or unclear risk studies

Domain Summary	de Vibe *et al* 2013	de Vibe *et al* 2015	Halland *et al* 2015	Erogul *et al* 2014	Rosenzweig *et al* 2013	Shearer *et al* 2015	Song *et al* 2015	Young *et al* 2001	Shapiro et al 1998	Phang *et al* 2015	Danilewitz *et al* 2016
Random Sequence Generation (Selection Bias)	L	L	L	L	H	H	U	H	U	L	U
Allocation Concealment (Selection Bias)	L	L	L	L	U	U	U	H	U	L	U
Blinding of participants and personnel (Performance Bias)	H	H	H	H	U	U	H	H	H	H	H
Blinding of outcome assessment (Detection Bias)	L	L	L	L	U	U	U	U	L	L	U
Incomplete outcome data (Attrition Bias)	L	L	L	L	H	H	H	U	L	L	L
Selective Reporting (Reporting Bias)	U	U	U	U	U	U	U	U	U	U	U
Other Bias	U	U	U	H	U	L	L	U	U	U	U
PAPER SUMMARY	**H**	**H**	**H**	**H**	**H**	**H**	**H**	**H**	**H**	**H**	**H**
OVERALL SUMMARY	**H**										

Appendix 10: PROSPERO registration for qualitative systematic review

PROSPERO
International prospective register of systematic reviews

NHS
National Institute for Health Research

UNIVERSITY of York
Centre for Reviews and Dissemination

Systematic review

1. * Review title.

Give the working title of the review, for example the one used for obtaining funding. Ideally the title should state succinctly the interventions or exposures being reviewed and the associated health or social problems. Where appropriate, the title should use the PI(E)COS structure to contain information on the Participants, Intervention (or Exposure) and Comparison groups, the Outcomes to be measured and Study designs to be included.

The effects and experiences of mindfulness-based interventions for health and social care undergraduate students: a systematic review of the qualitative literature

2. Original language title.

For reviews in languages other than English, this field should be used to enter the title in the language of the review. This will be displayed together with the English language title.

3. * Anticipated or actual start date.

Give the date when the systematic review commenced, or is expected to commence.
10/09/2018

4. * Anticipated completion date.

Give the date by which the review is expected to be completed.
14/12/2018

5. * Stage of review at time of this submission.

Indicate the stage of progress of the review by ticking the relevant Started and Completed boxes. Additional information may be added in the free text box provided.
Please note: Reviews that have progressed beyond the point of completing data extraction at the time of initial registration are not eligible for inclusion in PROSPERO. Should evidence of incorrect status and/or completion date being supplied at the time of submission come to light, the content of the PROSPERO record will be removed leaving only the title and named contact details and a statement that inaccuracies in the stage of the review date had been identified.
This field should be updated when any amendments are made to a published record and on completion and publication of the review. If this field was pre-populated from the initial screening questions then you are not able to edit it until the record is published.

The review has not yet started: No

Review stage	Started	Completed
Preliminary searches	Yes	Yes
Piloting of the study selection process	Yes	Yes
Formal screening of search results against eligibility criteria	Yes	Yes
Data extraction	Yes	Yes
Risk of bias (quality) assessment	Yes	Yes
Data analysis	Yes	Yes

Provide any other relevant information about the stage of the review here (e.g. Funded proposal, protocol not yet finalised).

6. * Named contact.

The named contact acts as the guarantor for the accuracy of the information presented in the register record.

Michelle O'Driscoll

Email salutation (e.g. "Dr Smith" or "Joanne") for correspondence:

Ms O'Driscoll

7. * Named contact email.

Give the electronic mail address of the named contact.

michelle.odriscoll@ymail.com

8. Named contact address

Give the full postal address for the named contact.

School of Pharmacy, Cavanagh Pharmacy Building, University College Cork, College Road, Cork

9. Named contact phone number.

Give the telephone number for the named contact, including international dialling code.

0868371432

10. * Organisational affiliation of the review.

Full title of the organisational affiliations for this review and website address if available. This field may be completed as 'None' if the review is not affiliated to any organisation.

University College Cork

Organisation web address:

11. * Review team members and their organisational affiliations.

Give the title, first name, last name and the organisational affiliations of each member of the review team. Affiliation refers to groups or organisations to which review team members belong.

Ms Michelle O'Driscoll. University College Cork

Dr Laura Sahm. School of Pharmacy, University College Cork
Professor Stephen Byrne. School of Pharmacy, University College Cork
Dr Sharon Lambert. School of Applied Psychology, University College Cork

12. * Funding sources/sponsors.

Give details of the individuals, organizations, groups or other legal entities who take responsibility for initiating, managing, sponsoring and/or financing the review. Include any unique identification numbers assigned to the review by the individuals or bodies listed.

None

13. * Conflicts of interest.

List any conditions that could lead to actual or perceived undue influence on judgements concerning the main topic investigated in the review.

None

14. Collaborators.

Give the name and affiliation of any individuals or organisations who are working on the review but who are not listed as review team members.

15. * Review question.

State the question(s) to be addressed by the review, clearly and precisely. Review questions may be specific or broad. It may be appropriate to break very broad questions down into a series of related more specific questions. Questions may be framed or refined using PI(E)COS where relevant.

What qualitative evidence is available about health and social care undergraduate students' experiences of taking part in a mindfulness-based intervention, and what effect did participation have?

16. * Searches.

Give details of the sources to be searched, search dates (from and to), and any restrictions (e.g. language or publication period). The full search strategy is not required, but may be supplied as a link or attachment.

The following databases will be searched from inception to September 2018: PubMed, PsycINFO, Embase, CINAHL, Academic Search Complete and the Cochrane Central Register of Controlled Trials (CENTRAL).

Reference searches and citation tracking will also be conducted.

17. URL to search strategy.

Give a link to a published pdf/word document detailing either the search strategy or an example of a search strategy for a specific database if available (including the keywords that will be used in the search strategies), or upload your search strategy.Do NOT provide links to your search results.

Alternatively, upload your search strategy to CRD in pdf format. Please note that by doing so you are consenting to the file being made publicly accessible.

Do not make this file publicly available until the review is complete

18. * Condition or domain being studied.

Give a short description of the disease, condition or healthcare domain being studied. This could include health and wellbeing outcomes.

Health and well-being - stress, burnout, productivity

19. * Participants/population.

Give summary criteria for the participants or populations being studied by the review. The preferred format includes details of both inclusion and exclusion criteria.

Inclusion: undergraduate health and social care students

Exclusion: general undergraduate students, postgraduate health and social care students, qualified health and social care professionals

20. * Intervention(s), exposure(s).

Give full and clear descriptions or definitions of the nature of the interventions or the exposures to be reviewed.

Any intervention that is Mindfulness-Based Stress Reduction (MBSR), Mindfulness-Based Cognitive Therapy (MBCT), or an adapted intervention that remains true to the teachings of either of these interventions.

21. * Comparator(s)/control.

Where relevant, give details of the alternatives against which the main subject/topic of the review will be compared (e.g. another intervention or a non-exposed control group). The preferred format includes details of both inclusion and exclusion criteria.

Control group not required for inclusion in this review.

22. * Types of study to be included.

Give details of the types of study (study designs) eligible for inclusion in the review. If there are no restrictions on the types of study design eligible for inclusion, or certain study types are excluded, this should be stated. The preferred format includes details of both inclusion and exclusion criteria.

An intervention is required to have occurred, but there are no other criteria for study design.

23. Context.

Give summary details of the setting and other relevant characteristics which help define the inclusion or exclusion criteria.

University setting, specifically undergraduate health and social care courses.

24. * Main outcome(s).

Give the pre-specified main (most important) outcomes of the review, including details of how the outcome is defined and measured and when these measurement are made, if these are part of the review inclusion criteria.

The effects that students found from taking part in the mindfulness-based intervention

Students' perceptions of the course before and/or after participation.

Students' experiences of taking part in the course

Students' feedback on how to bring this type of education forward

Timing and effect measures

Qualitative data

25. * Additional outcome(s).

List the pre-specified additional outcomes of the review, with a similar level of detail to that required for main outcomes. Where there are no additional outcomes please state 'None' or 'Not applicable' as appropriate to the review

Not applicable

Timing and effect measures

26. * Data extraction (selection and coding).

Give the procedure for selecting studies for the review and extracting data, including the number of researchers involved and how discrepancies will be resolved. List the data to be extracted.

Study selection shall follow the PRISMA flowchart - initial search, remove duplicates, screen titles, assess abstracts, make a decision based on eligibility of full text.

Data extraction shall be done using ENTREQ form. Data to be extracted: study setting, number of participants, method of data collection and method of data analysis, overall aim of each study, and information about the intervention delivered.

Study selection and data extraction shall be undertaken by two independent reviewers, and where disagreement arises, a third reviewer shall be included in discussions to resolve it.

27. * Risk of bias (quality) assessment.

State whether and how risk of bias will be assessed (including the number of researchers involved and how discrepancies will be resolved), how the quality of individual studies will be assessed, and whether and how this will influence the planned synthesis.

Quality of included studies shall be assessed using the CASP tool for qualitative research. The results of this shall moderate the findings of the review, but will not be used to guide inclusion or exclusion of the studies.

Quality shall be assessed by two independent reviewers, and any discrepancies shall be resolved by discussion, with a third reviewer called upon if required.

28. * Strategy for data synthesis.

Give the planned general approach to synthesis, e.g. whether aggregate or individual participant data will be used and whether a quantitative or narrative (descriptive) synthesis is planned. It is acceptable to state that a quantitative synthesis will be used if the included studies are sufficiently homogenous.

The qualitative data will be synthesised using a thematic synthesis approach. All text labelled "results" or "findings" shall be coded, and these codes shall be grouped into descriptive themes. These shall then be combined to create overarching analytical themes through several discussions between the authors.

29. * Analysis of subgroups or subsets.

Give details of any plans for the separate presentation, exploration or analysis of different types of participants (e.g. by age, disease status, ethnicity, socioeconomic status, presence or absence or co-morbidities); different types of intervention (e.g. drug dose, presence or absence of particular components of intervention); different settings (e.g. country, acute or primary care sector, professional or family care); or different types of study (e.g. randomised or non-randomised).

Not applicable

30. * Type and method of review.

Select the type of review and the review method from the lists below. Select the health area(s) of interest for your review.

Type of review

Cost effectiveness
No

Diagnostic
No

Epidemiologic
No

Individual patient data (IPD) meta-analysis
No

Intervention
Yes

Meta-analysis
No

Methodology
No

Narrative synthesis
No

Network meta-analysis
No

Pre-clinical
No

Prevention
No

Prognostic
No

Prospective meta-analysis (PMA)
No

Review of reviews
No

Service delivery
No

Synthesis of qualitative studies
Yes

Systematic review
Yes

Other
No

Health area of the review

Alcohol/substance misuse/abuse
No

Blood and immune system
No

Cancer

No
Cardiovascular
No
Care of the elderly
No
Child health
No
Complementary therapies
No
Crime and justice
No
Dental
No
Digestive system
No
Ear, nose and throat
No
Education
Yes
Endocrine and metabolic disorders
No
Eye disorders
No
General interest
No
Genetics
No
Health inequalities/health equity
No
Infections and infestations
No
International development
No
Mental health and behavioural conditions
Yes
Musculoskeletal
No
Neurological
No
Nursing
No
Obstetrics and gynaecology
No
Oral health
No
Palliative care
No
Perioperative care
No
Physiotherapy
No
Pregnancy and childbirth
No
Public health (including social determinants of health)
No
Rehabilitation
No
Respiratory disorders

No
Service delivery
No
Skin disorders
No
Social care
No
Surgery
No
Tropical Medicine
No
Urological
No
Wounds, injuries and accidents
No
Violence and abuse
No

31. Language.

Select each language individually to add it to the list below, use the bin icon to remove any added in error.
English

There is not an English language summary

32. Country.

Select the country in which the review is being carried out from the drop down list. For multi-national collaborations select all the countries involved.
Ireland

33. Other registration details.

Give the name of any organisation where the systematic review title or protocol is registered (such as with The Campbell Collaboration, or The Joanna Briggs Institute) together with any unique identification number assigned. (N.B. Registration details for Cochrane protocols will be automatically entered). If extracted data will be stored and made available through a repository such as the Systematic Review Data Repository (SRDR), details and a link should be included here. If none, leave blank.

34. Reference and/or URL for published protocol.

Give the citation and link for the published protocol, if there is one

Give the link to the published protocol.

Alternatively, upload your published protocol to CRD in pdf format. Please note that by doing so you are consenting to the file being made publicly accessible.

No I do not make this file publicly available until the review is complete

Please note that the information required in the PROSPERO registration form must be completed in full even if access to a protocol is given.

35. Dissemination plans.

Give brief details of plans for communicating essential messages from the review to the appropriate audiences.

Dissemination through PhD thesis submission, publication in an appropriate journal, and presentation at national and international conferences.

Do you intend to publish the review on completion?

Yes

36. Keywords.

Give words or phrases that best describe the review. Separate keywords with a semicolon or new line. Keywords will help users find the review in the Register (the words do not appear in the public record but are included in searches). Be as specific and precise as possible. Avoid acronyms and abbreviations unless these are in wide use.

mindfulness; healthcare; education; stress; qualitative

37. Details of any existing review of the same topic by the same authors.

Give details of earlier versions of the systematic review if an update of an existing review is being registered, including full bibliographic reference if possible.

38. * Current review status.

Review status should be updated when the review is completed and when it is published. For newregistrations the review must be Ongoing.
Please provide anticipated publication date

Review_Completed_not_published

39. Any additional information.

Provide any other information the review team feel is relevant to the registration of the review.

40. Details of final report/publication(s).

This field should be left empty until details of the completed review are available.

Give the link to the published review.

Appendix 11: ENTREQ statement for qualitative systematic review

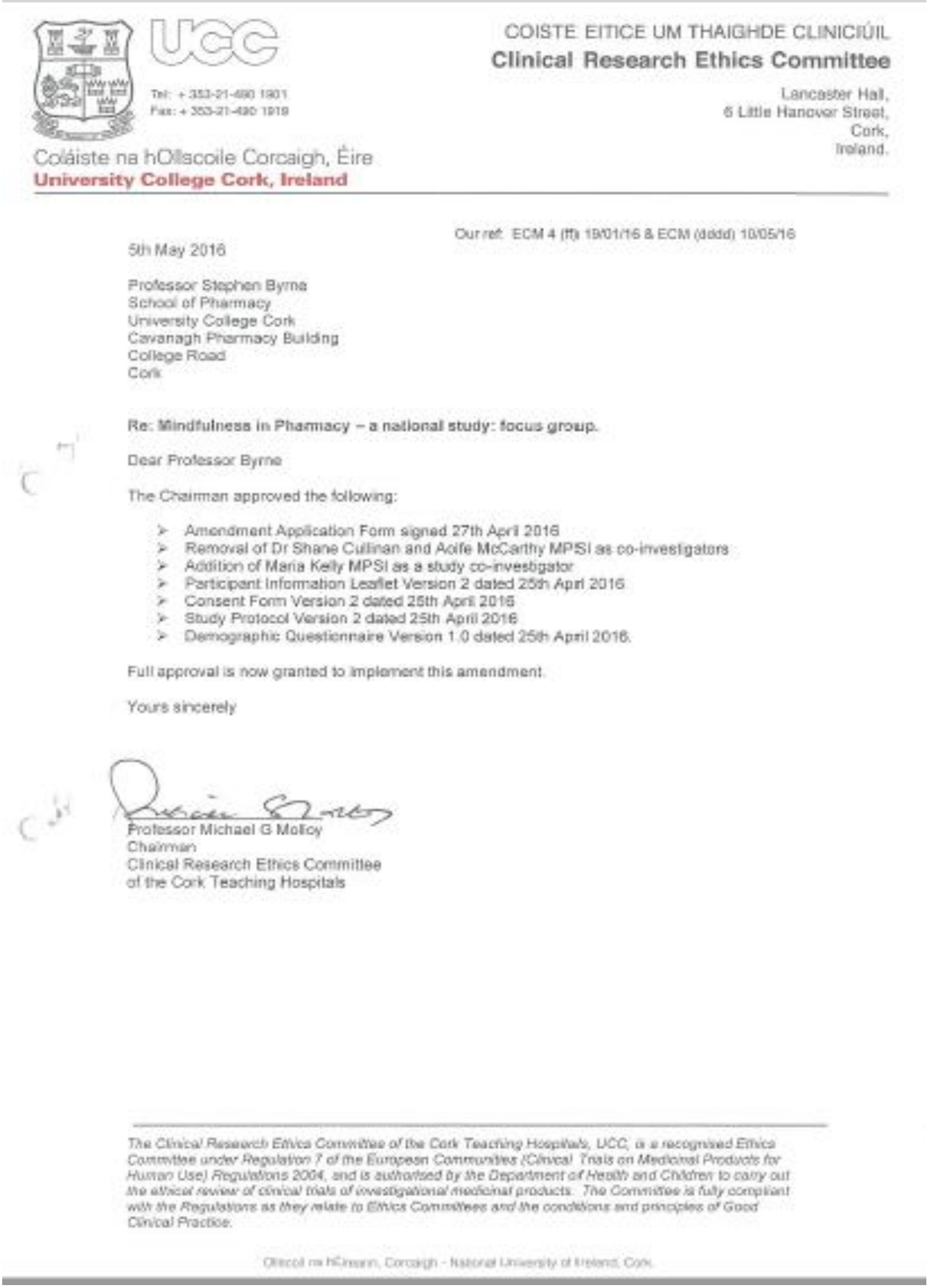
No	Item	Guide and description
1	Aim	State the research question the synthesis addresses.
2	Synthesis methodology	Identify the synthesis methodology or theoretical framework which underpins the synthesis, and describe the rationale for choice of methodology *(e.g. meta-ethnography, thematic synthesis, critical interpretive synthesis, grounded theory synthesis, realist synthesis, meta-aggregation, meta-study, framework synthesis).*
3	Approach to searching	Indicate whether the search was pre-planned (*comprehensive search strategies to seek all available studies)* or iterative (*to seek all available concepts until they theoretical saturation is achieved)*.
4	Inclusion criteria	Specify the inclusion/exclusion criteria *(e.g. in terms of population, language, year limits, type of publication, study type).*
5	Data sources	Describe the information sources used (e.g. *electronic databases (MEDLINE, EMBASE, CINAHL, psycINFO, Econlit), grey literature databases (digital thesis, policy reports), relevant organisational websites, experts, information specialists, generic web searches (Google Scholar) hand searching, reference lists)* and when the searches conducted; provide the rationale for using the data sources.
6	Electronic Search strategy	Describe the literature search *(e.g. provide electronic search strategies with population terms, clinical or health topic terms, experiential or social phenomena*

No	Item	Guide and description
		related terms, filters for qualitative research, and search limits).
7	Study screening methods	Describe the process of study screening and sifting *(e.g. title, abstract and full text review, number of independent reviewers who screened studies).*
8	Study characteristics	Present the characteristics of the included studies *(e.g. year of publication, country, population, number of participants, data collection, methodology, analysis, research questions).*
9	Study selection results	Identify the number of studies screened and provide reasons for study exclusion *(e.g., for comprehensive searching, provide numbers of studies screened and reasons for exclusion indicated in a figure/flowchart; for iterative searching describe reasons for study exclusion and inclusion based on modifications to the research question and/or contribution to theory development).*
10	Rationale for appraisal	Describe the rationale and approach used to appraise the included studies or selected findings *(e.g. assessment of conduct (validity and robustness), assessment of reporting (transparency), assessment of content and utility of the findings).*
11	Appraisal items	State the tools, frameworks and criteria used to appraise the studies or selected findings *(e.g. Existing tools: CASP, QARI, COREQ, Mays and Pope* [25]*; reviewer developed tools; describe the domains assessed: research team, study design, data analysis and interpretations, reporting).*

No	Item	Guide and description
12	Appraisal process	Indicate whether the appraisal was conducted independently by more than one reviewer and if consensus was required.
13	Appraisal results	Present results of the quality assessment and indicate which articles, if any, were weighted/excluded based on the assessment and give the rationale.
14	Data extraction	Indicate which sections of the primary studies were analysed and how were the data extracted from the primary studies? *(e.g. all text under the headings "results /conclusions" were extracted electronically and entered into a computer software).*
15	Software	State the computer software used, if any.
16	Number of reviewers	Identify who was involved in coding and analysis.
17	Coding	Describe the process for coding of data *(e.g. line by line coding to search for concepts).*
18	Study comparison	Describe how were comparisons made within and across studies *(e.g. subsequent studies were coded into pre-existing concepts, and new concepts were created when deemed necessary).*
19	Derivation of themes	Explain whether the process of deriving the themes or constructs was inductive or deductive.

No	Item	Guide and description
20	Quotations	Provide quotations from the primary studies to illustrate themes/constructs, and identify whether the quotations were participant quotations of the author's interpretation.
21	Synthesis output	Present rich, compelling and useful results that go beyond a summary of the primary studies (e.g. *new interpretation, models of evidence, conceptual models, analytical framework, development of a new theory or construct).*

Appendix 12: UCC ethical approval for pharmacy student focus groups



UCC

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Fax: + 353-21-490 1919

Coláiste na hOllscoile Corcaigh, Éire
University College Cork, Ireland

COISTE EITICE UM THAIGHDE CLINICIÚIL
Clinical Research Ethics Committee

Lancaster Hall,
6 Little Hanover Street,
Cork,
Ireland.

Our ref: ECM 4 (ff) 19/01/16 & ECM (ddd) 10/05/16

5th May 2016

Professor Stephen Byrne
School of Pharmacy
University College Cork
Cavanagh Pharmacy Building
College Road
Cork

Re: Mindfulness in Pharmacy – a national study: focus group.

Dear Professor Byrne

The Chairman approved the following:

- Amendment Application Form signed 27th April 2016
- Removal of Dr Shane Cullinan and Aoife McCarthy MPSI as co-investigators
- Addition of Maria Kelly MPSI as a study co-investigator
- Participant Information Leaflet Version 2 dated 25th April 2016
- Consent Form Version 2 dated 25th April 2016
- Study Protocol Version 2 dated 25th April 2016
- Demographic Questionnaire Version 1.0 dated 25th April 2016.

Full approval is now granted to implement this amendment.

Yours sincerely

Professor Michael G Molloy
Chairman
Clinical Research Ethics Committee
of the Cork Teaching Hospitals

The Clinical Research Ethics Committee of the Cork Teaching Hospitals, UCC, is a recognised Ethics Committee under Regulation 7 of the European Communities (Clinical Trials on Medicinal Products for Human Use) Regulations 2004, and is authorised by the Department of Health and Children to carry out the ethical review of clinical trials of investigational medicinal products. The Committee is fully compliant with the Regulations as they relate to Ethics Committees and the conditions and principles of Good Clinical Practice.

Ollscoil na hÉireann, Corcaigh - National University of Ireland, Cork

Appendix 13: RCSI ethical approval for pharmacy student focus groups

Royal College of Surgeons in Ireland
The Research Ethics Committee
121 St. Stephens Green, Dublin 2, Ireland.
Tel: +353 1 4022205 Email: recadmin@rcsi.ie

RCSI
ROYAL COLLEGE OF SURGEONS IN IRELAND

Dr David Smith, Acting Chair
Dr Niamh Clarke, Convenor

22nd August 2016

Michelle O'Driscoll
Cavanagh Pharmacy Building,
University College Cork
College Road,
Co. Cork

Ethics Reference No:	REC 1230
Project Title:	Mindfulness in Pharmacy - A National Study
Researchers Name (lead applicant):	Ms Michelle O'Driscoll (School of Pharmacy, UCC)
Principal investigator on the project (PI):	Dr Laura Sahm (School of Pharmacy UCC)
Other Individuals involved:	Prof Stephen Byrne, Ms Maria Kelly (School of Pharmacy, UCC) and Ms Sian Aherne (RCSI School of Pharmacy)

Dear Ms O'Driscoll,

Thank you for your Research Ethics Committee (REC) application. We are pleased to advise that ethical approval has been granted by the committee for this study.

This letter provides approval for data collection for the time requested in your application and for an additional 6 months. This is to allow for any unexpected delays in proceeding with data collection. Therefore this research ethics approval will expire on 4th May 2017.

Where data collection is necessary beyond this point, approval for an extension must be sought from the Research Ethics Committee.

This ethical approval is given on the understanding that:

- All personnel listed in the approved application have read, understand and are thoroughly familiar with all aspects of the study.
- Any significant change which occurs in connection with this study and/or which may alter its ethical consideration must be reported immediately to the REC, and an ethical amendment submitted where appropriate.
- Please submit a final report to the REC upon completion of your project.

We wish you all the best with your research.

Yours sincerely,

Niamh Clarke

PP Dr Niamh Clarke (Convenor)
Dr David Smith (Acting Chair)

Appendix 14: TCD ethical approval for pharmacy student focus groups

Coláiste na Tríonóide, Baile Átha Cliath
Trinity College Dublin
Ollscoil Átha Cliath | The University of Dublin

Ms Michelle O'Driscoll,
School of Pharmacy,
Cavanagh Pharmacy Building,
University College Cork,
College Road,
Cork.

Ref. 2016-02-01

11 May 2016

Dear Michelle,

Re: Mindfulness in Pharmacy – A national study: Focus Groups

I am pleased to inform you that the above project now has approval from the School of Pharmacy and Pharmaceutical Sciences Research Ethics Committee, with the following condition:

- The demographic questionnaire added at revision stage (Appendix 8) gathers details which potentially could identify a participant despite pseudonymization (*e.g.* there may be only a single person of a particular gender, age and nationality). Any presentation of results must be sensitive to this danger and report only collated demographics that cannot lead to identification of individuals.

You are reminded that any significant deviation from the research description in the application requires approval from the School of Pharmacy and Pharmaceutical Sciences Research Ethics Committee before implementation.

Please also note the reporting requirements outlined on the Committee's website (http://pharmacy.tcd.ie/research/SoPPS_REC.php), in particular the need for:

- An immediate report in writing (by email to pharmacy.ethics@tcd.ie) of any serious or unexpected adverse events on participants, or unforeseen events that might affect the benefits/risks ratio as outlined in the application.
- Annual reports (report form on the Committee's website).
- An end of project report (report form on the Committee's website).

Please quote the reference number 2016-02-01 in any further correspondence.

We wish you success with your research.

Yours sincerely,

Sheila Ryder,
Chairperson,
School of Pharmacy and Pharmaceutical Sciences Research Ethics Committee.

Sheila Ryder
Chairperson
Research Ethics Committee
School of Pharmacy and Pharmaceutical Sciences

Panoz Building, East End 4/5,
Trinity College,
Dublin 2, Ireland.

Tel. +353 1 896 2786
E-mail pharmacy.ethics@tcd.ie
http://pharmacy.tcd.ie/research/SoPPS_REC.php

Síle Ní Mhaicnigh
Cathaoirleach
Coiste um Eitic Thaighde
Scoil na Cógaíochta agus na nEolaíochtaí Cogaíochta

Foirgneamh Panoz, An Taobh Thoir 4/5,
Coláiste na Tríonóide,
Baile Átha Cliath 2, Éire.

Teil. +353 1 896 2786
R-phost pharmacy.ethics@tcd.ie
http://pharmacy.tcd.ie/research/SoPPS_REC.php

Appendix 15: COREQ checklist for student focus groups

Category	Question	Answer
Personal characteristics		
Interviewer/facilitator	Which author/s conducted the interview or focus group?	MOD conducted all focus groups, with MK also present for the first two.
Credentials	What were the researcher's credentials e.g. PhD, MD	MOD – MPharm MK – MPharm
Occupation	What was their occupation at the time of the study?	Qualified pharmacists and research students
Gender	Was the researcher male or female?	Female
Experience and training	What experience or training did the researcher have?	MK - extensive qualitative research experience MOD - trained in conduct, analysis and theory
Relationship with participants		
Relationship established	Was a relationship established prior to study?	The researchers introduced themselves before study commencement.
Participant knowledge of the interviewer	What did the participants know about the researcher?	Participants were informed that the primary researcher was conducting the focus group as part of their PhD.
Interviewer characteristics	What characteristics were reported about the interviewer/facilitator?	Participants were told that the researcher wanted to see what the

		current pharmacy degree was like from their experience, and how to better support students.
Theoretical framework		
Methodological orientation and theory	What methodological orientation was stated to underpin the study?	Analysis was conducted using Braun and Clarke thematic analysis.
Participant selection		
Sampling	How were participants selected?	Participants were selected using purposive sampling and snowball sampling.
Method of approach	How were participants approached?	Participants received recruitment emails from a gatekeeper in each School of Pharmacy inviting them to contact the researcher if they were interested.
Sample size	How many participants?	A total of 20 students took part in the focus groups
Non-participation	How many people refused to participate or dropped out?	n/a
Setting		
Setting of data collection	Where was the data collected?	Data was collected in a suitable room in the respective pharmacy buildings
Presence of non-participants	Was anyone else present besides the participants and researchers?	One pharmacy school sent two staff members to sit in on the focus group, but they did not participate in the focus group in any way.

Description of sample	Characteristics of sample?	Demographic information is presented in results.
Data Collection		
Interview guide	Were questions, prompts, guides provided by the authors? Was it pilot tested?	A topic guide was developed by the authors, and piloted on the first focus group. No changes were necessary. This focus group was included in the results.
Repeat interviews	Any repeat interviews?	No
Audio/visual recording	Did the research use audio/ visual recording?	Audio recording was conducted, with informed consent
Field notes	Were field notes made during or after FGs?	MOD made field notes immediately after the focus groups, which were used to refine the topic guide.
Duration	What was the FG duration?	Focus groups lasted from 13- 27 mins (average 21 min)
Data saturation	Was data saturation discussed?	While participation was limited, it was felt that the final focus group raised no new themes.
Transcripts returned	Were transcripts returned to participants for comment and/or correction?	No, however participants were informed that they were free to request transcripts of their contribution to the focus group if they so wished.
Data analysis		

Number of data coders	How many data coders coded the data?	MOD coded all five transcripts, and LS independently coded four of the five transcripts.
Description of the coding tree	Did authors provide description of the coding tree	No, a description of the coding tree was not provided.
Derivation of themes	Were themes identified in advance or derived from the data?	Themes were derived from the data itself.
Software	What software was used to manage the data?	NVivo Version 11 was used to facilitate coding of the data.
Participant checking	Did participants provide feedback on the findings>	No, participants did not provide feedback of the findings.
Reporting		
Quotations presented	Were participant quotations presented and identified to illustrate the themes?	Yes, quotations were used to illustrate the findings and were identified by focus group and participant number.
Data and findings consistent	Was there consistency data and the findings?	Yes
Clarity of major themes	Were major themes clearly presented in the findings?	Yes
Clarity of minor themes	Is there a description of diverse cases/ minor themes?	Yes

Appendix 16: UCC ethical approval for pharmacy student mindfulness intervention – face-to-face and online

UCC
Tel: + 353-21-490 1901
Fax: + 353-21-490 1919
Coláiste na hOllscoile Corcaigh, Éire
University College Cork, Ireland

COISTE EITICE UM THAIGHDE CLINICIÚIL
Clinical Research Ethics Committee
Lancaster Hall,
6 Little Hanover Street,
Cork,
Ireland.

Our ref: ECM 4 (e) 05/07/16

6th July 2016

Dr Laura Sahm
Senior Lecturer
University College Cork
School of Pharmacy
College Road
Cork

Re: Mindfulness in Pharmacy – A National Study: Intervention.

Dear Dr Sahm

Expedited approval is granted to carry out the above study at:

- University College Cork.

The following documents have been approved:

- Signed Application Form
- Study Protocol Version 1 dated 20th May 2016
- Participant Information Leaflet Version 1 dated 20th May 2016
- Consent Form Version 1 dated 20th May 2016
- Demographic Questionnaire Version 1.0 dated 20th May 2016
- Study Questionnaires
- CV for Chief Investigator
- Insurance Certificate.

We note that the co-investigator involved in this study will be:

- Michelle O'Driscoll, MPharm and Professor Stephen Byrne (PhD Supervisors).

Yours sincerely

Professor Michael G Molloy
Chairman
Clinical Research Ethics Committee
of the Cork Teaching Hospital

The Clinical Research Ethics Committee of the Cork Teaching Hospitals, UCC, is a recognised Ethics Committee under Regulation 7 of the European Communities (Clinical Trials on Medicinal Products for Human Use) Regulations 2004, and is authorised by the Department of Health and Children to carry out the ethical review of clinical trials of investigational medicinal products. The Committee is fully compliant with the Regulations as they relate to Ethics Committees and the conditions and principles of Good Clinical Practice.

COISTE EITICE UM THAIGHDE CLIN
Clinical Research Ethics Comm

Lancast
6 Little Hanover

Fax: + 353-21-490 1919

Coláiste na hOllscoile Corcaigh, Éire
University College Cork, Ireland

Our ref: ECM 4 (e) 05/07/16 & ECM 3 (bb) 09/06/16

28th July 2016

Dr Laura Sahm
Senior Lecturer
University College Cork
School of Pharmacy
College Road
Cork

Re: Mindfulness in Pharmacy – A National Study: Intervention.

Dear Dr Sahm

The Chairman approved the following:

- Amendment Application Form signed 18th July 2016
- Study Protocol Version 2 dated 13th July 2016
- Consent Form Version 2 dated 13th July 2016
- Participant Information Sheet Version 2 dated 13th July 2016
- Perceived Stress Scale Questionnaire
- Jefferson Scale of Empathy 140716 Version 1.2.1).

Yours sincerely

Professor Michael G Molloy
Chairman
Clinical Research Ethics Committee
of the Cork Teaching Hospital

The Clinical Research Ethics Committee of the Cork Teaching Hospitals, UCC, is a recognised Ethics Committee under Regulation 7 of the European Communities (Clinical Trials on Medicinal Products for Human Use) Regulations 2004, and is authorised by the Department of Health and Children to carry out the ethical review of clinical trials of investigational medicinal products. The Committee is fully compliant with the Regulations as they relate to Ethics Committees and the conditions and principles of Good Clinical Practice.

Appendix 17: Demographics form

Demographic Questionnaire V.1 – 20-5-16
Study Number: _____.

1. **Gender (please circle): Male / Female**

2. **Nationality: _____.**

3. **Age: _____.**

4. **Previous work in a pharmacy? (please circle) Yes / No**

   If yes, how long? _____.

5. **Previous degree? (please circle) Yes / No**

   If yes, please list: _____.

6. **No. of children: _____.**

7. **University of Study: _____.**

8. **Year of Study: _____.**

Appendix 18: COREQ checklist for participant semi-structured interviews

Category	Question	Answer
Personal characteristics		
Interviewer/facilitator	Which author/s conducted the interview or focus group?	MOD conducted all 21 interviews.
Credentials	What were the researcher's credentials e.g. PhD, MD	MOD – MPharm, and training in the delivery of Mindfulness-Based Interventions.
Occupation	What was their occupation at the time of the study?	Qualified pharmacist and research student.
Gender	Was the researcher male or female?	Female
Experience and training	What experience or training did the researcher have?	MOD - trained in conduct, analysis and theory, experience in qualitative research, and in the delivery of mindfulness-based interventions.
Relationship with participants		
Relationship established	Was a relationship established prior to study?	MOD had delivered the mindfulness course to students
Participant knowledge of the interviewer	What did the participants know about the researcher?	Participants knew MOD from the delivery of the mindfulness course, and knew that she was a PhD researcher
Interviewer characteristics	What characteristics were reported about the interviewer/facilitator?	Participants were told that the researcher wanted to hear what the mindfulness course was like from their experience, and how best to bring the findings forward.

Theoretical framework		
Methodological orientation and theory	What methodological orientation was stated to underpin the study?	Analysis was conducted using Braun and Clarke thematic analysis.
Participant selection		
Sampling	How were participants selected?	Any participants that had completed 3 out of 4 of the mindfulness classes were invited to take part in the interviews.
Method of approach	How were participants approached?	Participants received recruitment emails, inviting them to contact the researcher if they were interested.
Sample size	How many participants?	A total of 21 students took part in the interviews.
Non-participation	How many people refused to participate or dropped out?	40 students were eligible to participate. There was no response from 19 students.
Setting		
Setting of data collection	Where was the data collected?	Interviews were held in a suitable room in the pharmacy building.
Presence of non-participants	Was anyone else present besides the participants and researchers?	No.
Description of sample	Characteristics of sample?	A total of 21 participants, 62% female, representing all years of study.
Data Collection		
Interview guide	Were questions, prompts, guides provided by the authors? Was it pilot tested?	A topic guide was developed by the authors, and piloted on the first interview. No major changes were necessary, so this interview was included in the results. The topic guide was used to guide the

		semi-structured interviews, and was changed iteratively as the interviews progressed.
Repeat interviews	Any repeat interviews?	No
Audio/visual recording	Did the research use audio/ visual recording?	Audio recording was conducted, with informed consent
Field notes	Were field notes made during or after interviews?	MOD made field notes immediately after the interviews, which were used to refine the topic guide.
Duration	What was the interview duration?	A total of 285 minutes of data was recorded, with an average interview length of 16 minutes 10 seconds.
Data saturation	Was data saturation discussed?	Yes. The Francis method was used to ensure that once 18 interviews had been conducted, the three subsequent interviews produced no new themes.
Transcripts returned	Were transcripts returned to participants for comment and/or correction?	No, however participants were informed that they were free to request transcripts of their interviews if they so wished.
Data analysis		
Number of data coders	How many data coders coded the data?	All 21 transcripts were independently coded by both MOD and LS.
Description of the coding tree	Did authors provide description of the coding tree	No, a description of the coding tree was not provided.
Derivation of themes	Were themes identified in advance or derived from the data?	Themes were derived from the data itself.

Software	What software was used to manage the data?	NVivo Version 11 was used to facilitate coding of the data.
Participant checking	Did participants provide feedback on the findings	No, participants did not provide feedback of the findings.
Reporting		
Quotations presented	Were participant quotations presented and identified to illustrate the themes?	Yes, quotations were used to illustrate the findings and were identified by participant number.
Data and findings consistent	Was there consistency between the data and the findings?	Yes
Clarity of major themes	Were major themes clearly presented in the findings?	Yes
Clarity of minor themes	Is there a description of diverse cases/ minor themes?	Yes

Appendix 19: RCSI ethical approval for pharmacy student mindfulness intervention – online

Royal College of Surgeons in Ireland
The Research Ethics Committee
121 St. Stephens Green, Dublin 2, Ireland.
Tel: +353 1 4022205 Email: recadmin@rcsi.ie

ROYAL COLLEGE OF SURGEONS IN IRELAND

Dr David Smith, Acting Chair
Dr Niamh Clarke, Convenor

22nd August 2016

Michelle O'Driscoll
Cavanagh Pharmacy Building,
University College Cork
College Road,
Co. Cork

Ethics Reference No:	REC 1276
Project Title:	Mindfulness in Pharmacy - A National Study: Intervention
Researchers Name (lead applicant):	Ms Michelle O'Driscoll (School of Pharmacy, UCC)
Principal Investigator on the project (PI):	Dr Laura Sahm (School of Pharmacy UCC)
Other Individuals Involved:	Prof Stephen Byrne, Ms Maria Kelly (School of Pharmacy, UCC) and Ms Siun Aherne (RCSI School of Pharmacy)

Dear Ms O'Driscoll,

Thank you for your Research Ethics Committee (REC) application. We are pleased to advise that ethical approval has been granted by the committee for this study.

This letter provides approval for data collection for the time requested in your application and for an additional 6 months. This is to allow for any unexpected delays in proceeding with data collection. Therefore this research ethics approval will expire on **11th May 2017.**

Where data collection is necessary beyond this point, approval for an extension must be sought from the Research Ethics Committee.

This ethical approval is given on the understanding that:

- All personnel listed in the approved application have read, understand and are thoroughly familiar with all aspects of the study.
- Any significant change which occurs in connection with this study and/or which may alter its ethical consideration must be reported immediately to the REC, and an ethical amendment submitted where appropriate.
- Please submit a final report to the REC upon completion of your project.

We wish you all the best with your research.

Yours sincerely,

Niamh Clarke

PP Dr Niamh Clarke (Convenor)
Dr David Smith (Acting Chair)

Appendix 20: TCD ethical approval for pharmacy student mindfulness intervention – online

Coláiste na Tríonóide, Baile Átha Cliath
Trinity College Dublin
Ollscoil Átha Cliath | The University of Dublin

Ms Michelle O'Driscoll,
School of Pharmacy,
Cavanagh Pharmacy Building,
University College Cork,
College Road,
Cork.

Ref. 2016-06-01

20 September 2016

Dear Michelle,

Re: Mindfulness in Pharmacy – A national study: Intervention

I am pleased to inform you that the above project now has approval from the School of Pharmacy and Pharmaceutical Sciences Research Ethics Committee.

You are reminded that any significant deviation from the research description in the application requires approval from the School of Pharmacy and Pharmaceutical Sciences Research Ethics Committee before implementation.

Please also note the reporting requirements outlined on the Committee's website (http://pharmacy.tcd.ie/research/SoPPS_REC.php), in particular the need for:

- An immediate report in writing (by email to pharmacy.ethics@tcd.ie) of any serious or unexpected adverse events on participants, or unforeseen events that might affect the benefits/risks ratio as outlined in the application.
- Annual reports (report form on the Committee's website).
- An end of project report (report form on the Committee's website).

Please quote the reference number 2016-06-01 in any further correspondence.

We wish you success with your research.

Yours sincerely,

Sheila Ryder,
Chairperson,
School of Pharmacy and Pharmaceutical Sciences Research Ethics Committee.

Sheila Ryder
Chairperson
Research Ethics Committee
School of Pharmacy and Pharmaceutical Sciences

Panoz Building, East End 4/5,
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http://pharmacy.tcd.ie/research/SoPPS_REC.php

Síle Ní Mharcaigh
Cathaoirleach
Coiste um Eitic Theicneolaíochta
Scoil an Cógaisíochta agus an nEolaíochtaí Cógaisíochta

Foirgneamh Panoz, An Taobh Thoir 4/5,
Coláiste na Tríonóide,
Baile Átha Cliath 2, Éire.

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http://pharmacy.tcd.ie/research/SoPPS_REC.php

Appendix 21: Online participant answers to free-text questions

Question 1. What did you like most about the mindfulness course?

1. Helped me to keep in touch with my thoughts and feelings. I am so stressed in college at the moment. It is so competitive and I am trying to work at the weekends. The whole time I am in work, I just want to be at home studying so I don't get left behind. I find it hard to not feel guilty whenever I am socialising because of college work.
2. I liked how it gave me more help with managing my anxiety and the overwhelming stress I can feel with the pharmacy course sometimes.
3. Was a good way of relaxation and reflection
4. The body scans
5. It is prompting me to create and build an awareness of my emotions and behaviour surrounding my studies.
6. It was one hour of forgetting about study and work
7. Being able to relax in the evenings
8. It provided some good techniques to cope with negative thoughts and stressful situations.
9. it’s a good way to have a look deeper into your mind
10. The good feeling of feeling emotions related to activity.
11. It prompted me to pay greater attention to the smaller details of life.
12. The facilitator had a very soothing voice, I liked the way it was structured and I thought the content was well delivered.
13. pace, flexibility, sense of structure
14. I thought the exercises were useful and interesting
15. opportunity to reflect on the bigger picture
16. How it made me become more aware of my thoughts and actions
17. I liked the explanation in scientific ways. For example, the stress cycle. It really appealed to me as a pharmacy student as we seem to be more calculating and have methodical minds. I liked the idea of breathing as an anchor. I liked some of the images and methods used. I really liked the idea of just being with your emotions and not struggling with them. I found week 3 the most beneficial. The poem, "The Guest House" also really resonated with me. The fact that thoughts are not facts and the story about Jonny walking to school really resonated with me also.
18. Body Scan

Question 2. What did you dislike the most about the mindfulness course?

1. A lot on my plate at the moment. I just had to set aside the time to complete it. I would have loved a face-to-face session.
2. I found it difficult to balance the college work load and find time to complete the weekly course along with some of the homework. I found myself getting stressed about not completing the course in time or doing all the homework. Also, I completed week 2 of the course, but it wouldn't let me do the survey on my phone which was annoying.
3. Felt like i hadn't time for it sometimes
4. the repetition of some of the exercises
5. This interface is not as straight forward as I would like! It has been a little confusing to utilise, but I can't figure out why :)
6. Sometimes I felt too relaxed and almost asleep
7. It could often slip my mind, or I'd miss the time frame given.
8. An indication of the amount of time needed to set aside for the teaching sessions and the weekly exercises would have been very welcome.
9. nothing
10. nothing.
11. The Body Movement exercise as I felt that the stretches had to be held too long and this made the exercise frustrating and didn't help with my mindfulness.
12. Sometimes it was difficult to fit it in.
13. not knowing how long exactly each section was so i could set time apart for it, not being able to pause and resume.
14. I thought the format of the course became boring and repetitive
15. required me to focus when I was tired and wanted to relax
16. The sessions were quite long
17. I found the first 2 weeks very hard to get into. I think I was very doubtful and I just didn't know what to expect. Sometimes I found it very slow and tedious, and found it hard to focus and just wanted to get it over and done with. Sometimes it felt like a task I had to complete on my extremely long list of things that had to get done!
18. Daily homework

Question 3. What benefit(s) did you obtain from the course?

1. It taught me how to think about my feelings at the end of the day and to try to release my stress somehow before I sleep.
2. I think I benefited because it helped me to calm my mind and start taking more care of myself rather than just being consumed by work and stress from Pharmacy. This year is a tough year with lots of exams and it was nice to be able to step back from the thoughts about needing to do more or feeling guilty over doing something other than studying or assignments.
3. I think I have, it introduced me to a new concept
4. Yes, I feel more calm as a person and able to reflect on my thoughts and de stress
5. Is it over already?? This is rather confusing! :)
6. Yes, I've learnt that everyone gets stressed but you need to deal with it instead of letting it build up and become more aware of my surroundings
7. Yes. Learning relaxation techniques
8. Yes, I will try and make mindfulness part of my regular practice. It came at a particularly busy and stressful time at university and home-life. Not only did the course provide relaxation at the end of busy days, I also learnt some very useful techniques to deal with negative thoughts. Thank you.
9. yes, it enabled me to look deeper
10. I do, I feel that it effectively helped me straighten out my thoughts.
11. Yes, as now I can employ the mindfulness techniques, like the breathing exercise, to everyday life especially around exam time.
12. Yes, I like using it to be able to relax or 'zone out' from the washing machine effect in my mind at times which I usually refer to as the 'noise' in my mind. I found the course to be engaging and interesting and if nothing else, it broadened my horizons in terms of mindfulness which I would not have been very familiar with before taking this course. I generally do enjoy exercises in self-awareness so this complemented the course.
13. yes, I feel better able to cope, better able to deal and know there is support and ways to get around stress in life by myself.
14. Yes, it has made me more aware of my feelings and behaviour on a daily basis
15. Yes, gave me a reminder to look at the bigger picture and focus on my body
16. Yes, I have started to reflect on my actions and notice more things in my environment
17. Yes, it gave me so many new ways of thinking and images and methods I can use to respond to my emotions in different ways. I really want to put them

	into practice, I really hope I won't forget them. It would be great if some of the aspects of the course could be made available to download or something like that, so we could revisit them any time we felt like we just needed to be reminded of what to do in certain situations. It's just a thought, I know I would use it if it were available to me. I found it really enjoyable overall and even though it took me a while to get into, I'm really glad I chose to do it! So thank you for the opportunity, best of luck with the project!
18.	Not particularly, it was a good course, very well planned, I just don't think mindfulness is for me.

Appendix 22: Attendance Feedback Form

You signed up for a mindfulness course as part of this research project, and this short follow-up form will help researchers to understand more about the research results.

Why did you sign up to this study? Tick all that apply:

_____Sounded like it would be beneficial

_____Wanted to help with the research process

_____Curious about what mindfulness was about

_____Felt stressed, wanted to learn something that could help now

_____Felt fine, but wanted to learn something that could help in the future

_____All my friends were signing up

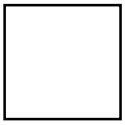
_____Didn't want to miss out on anything that my colleagues would be learning

_____Wanted to take some time for myself

_____Other - please explain:

Pick the sentence that best describes your experience – write the answer number in the box:

1. I signed up but didn't attend any of the course
2. ! signed up and attended one or two classes only
3. I signed up and attended three or four of the classes



If you picked answer number 1, why did you not turn up? Tick all that apply:

_____Busy with college assignments

_____Busy with study for upcoming exam(s)

_____Too busy with extracurricular activities

_____Too busy with personal engagements

_____Inconvenient time on the timetable

_____Lack of interest in the topic

_____Negative feedback from colleagues in the other group

_____Lack of energy/too tired

_____Coping fine without a course of this type

_____Other – please explain:

If you picked answer number 2, what contributed to you not completing the course? Tick all that apply:

_____Busy with college assignments

_____Busy with study for upcoming exam

_____Busy with extracurricular activities

_____Busy with personal engagements

_____Lack of interest in the topic

_____Not what I expected when I signed up

_____Lack of energy/too tired

_____Two hours per class was too long

_____Inconvenient time on the timetable

_____Didn't see the relevance of the course content to the pharmacy degree

_____Coping fine without a course of this type

_____Other – please explain:

If you picked answer number 3, what contributed to your high attendance? Tick all that apply:

_____Timetabling of the course

_____Group Interaction

_____Class atmosphere

_____Teaching methods

_____Desire to take time for yourself

_____Awareness of potential future benefit

_____Seeing benefits as the weeks progressed

_____Taking time out of a busy schedule

_____Interesting concepts and/or skills being taught

_____Other – please explain:

.